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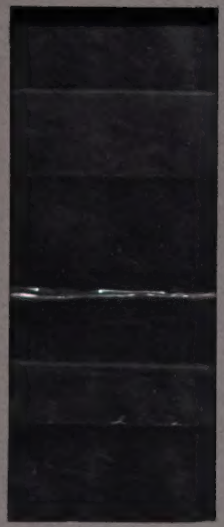

GenRad

GR5000/GR9000
Test Fixture Manual

9007–0257–02

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WARNINGS

- Do not remove covers. Potentially lethal voltages are present inside the system. Observe all WARNING markings on the equipment and WARNING notices in the manual. If servicing is necessary, it should be performed only by a qualified person familiar with the electrical shock hazards present inside the system.
- Grounding circuit continuity is vital for safe operation of the equipment. Never operate equipment with grounding conductor disconnected.
- Safeguard your hands and fingers while handling any fixture or other accessory. Be sure it is securely supported if you reach under it. If it is heavy, you must have another person help to move it.
- The symbol IEC417 on equipment signifies that the manual contains information to prevent injury or equipment damage. Observe and heed all WARNING notices in the manuals and the equipment. WARNINGS call attention to personnel safety information.
- Replace any fuse only with the same type and ratings as labeled on the equipment and/or listed in the manual.

MISES EN GARDE

- Ne pas enlever les couvercles. Les niveaux de tension se trouvant dans le système sont extrêmement dangereux. Respectez toutes les consignes de sécurité figurant sur l'équipement et les MISES EN GARDE données dan ce manuel. Seule une personne qualifée, connaisant les risques de décharge électrique du système, est autorisée à effecteur les opérations de nettoyage ou de réparation du système.
- Le circuit doit être mis à la terre sans discontinuation pour garantir un fonctionnement sans danger de l'équipement. Ne jamais faire fonctionner l'équipement pendant que le raccord à la terre est déconnecté.
- Protégez–vous les mains et les doigts pendant le maniement de tout dispositif de serrage ou autre accessoire. Assurez–vous que ceux–ci soient bien solidement fixés en place, avant de vous pencher sous eux. Si l'accessoire en question est trop lourd, faites–vous aider pour le déplacer.
- Le symbole IEC417 figurant sur l'équipement signifie que le manuel contient des informations permettant d'empêcher les accidents ou l'endommagement de l'équipement. Respectez toutes les consignes de MISES EN GARDE données dans le manuel et figurant sur l'équipement. Les MISES EN GARDE attirent l'attention sur la nécessité de se protéger.
- Ne remplacez les fusibles qu'avec des fusibles du même type et de la même valuer que ceux mentionnés sur l'équipement et figurant dans le manuel.

WARNHINWEISE

- Abdeckungen nicht entfernen. Potentiell lebensgefährliche Spannungsbedingungen innerhalb des Systems vorhanden. Alle auf der Einrichtung befindlichen WARNMARKIERUNGEN und im Handbuch enthaltenen WARNHINWEISE beachten. Wartungsarbeiten dem qualifizierten Personal überlassen, das mit den innerhalb des Systems vorhandenen Gefahren eines elektrischen Schlags vertraut ist.
- Die Erdung des Schaltungsdurchgangs ist eine Grundvoraussetzung für den sicheren Betrieb der Einrichtung. Einrichtung niemals ohne Erdleiter betreiben.
- Hände und Finger bei der Handhabung einer Spannvorrichtung oder eines anderen Zubehörteils schützen. Sich vor der Plazierung der Hände unterhalb der Einrichtung vergewissern, daß die Einrichtung über ausreichenden Halt verfügt. Falls die Einrichtung schwer ist, sich von einer anderen Person beim Tragen helfen lassen.
- Das auf der Einrichtung befindliche Symbol IEC417 bedeutet, daß das Handbuch Informationen zur Verhinderung von Körperverletzungen oder Sachschäden enthält. Alle in den Handbüchern enthaltenen und auf der Einrichtung befindlichen WARNHINWEISE beachten und befolgen. WARNHINWEISE sollen auf Informationen zur persönlichen Sicherheit aufmerksam machen.
- Sicherungen nur durch Sicherungen des gleichen Typs und der gleichen Nennleistung ersetzen. Auf der Einrichtung befindliche Etiketten und im Handbuch enthaltene Informationen zu Rate ziehen.

AVISOS

- Não remova as tampas. Há voltagens potencialmente fatais presentes na parte interna do sistema. Observe todas as marcações de AVISOS no equipamento e discrições de AVISOS no manual. Se for necessário fazer manutenção, esta deve ser feita somente por uma pessoa qualificada familiarizada com os perigos de choques elétricos presentes na parte interna do sistema.

- A continuidade do circuito de aterramento é vital para a operação segura do equipamento. Nunca opere o equipamento com o cabo de aterramento desligado.

- Proteja as suas mãos e dedos ao operar qualquer dispositivo ou outro acessório. Certifique–se que ele esteja suportado com segurança se você tiver que alcançar algo debaixo dele. Se for pesado, você deve ter a ajuda de uma outra pessoa para movê–lo.

- O simbolo IEC417 no equipamento significa que o manual contém informações para prevenir ferimentos ou danos ao equipamento. Observe e preste atenção a todos os AVISOS nos manuais e no equipamento. Os AVISOS chamam a atenção a informações sobre a segurança pessoal.

- Substitua qualquer fusivel somente com um do mesmo tipo e da mesma capacidade nominal como marcado no equipamento e listado no manual.

ADVERTENCIAS

- No quitar las tapas. En el interno del sistema hay voltajes potencialmente mortales. Obsérvense todos los rótulos de ADVERTENCIA presentes en el equipo, así como la descripción de las notas de ADVERTENCIA presentadas en el manual. De ser necesario, el servicio de mantenimiento deberá ser efectuado únicamente por personal calificado que esté familiarizado con los peligros de choque eléctrico presentes en el sistema.

- La continuidad del circuito de puesta a tierra es de vital importancia para el functionamiento seguro del equipo. Nunca se debe usar el equipo con el conductor de puesta a tierra desconectado.

- Protéjanse las manos y los dedos toda vez que sea necesario manipular un dispositivo u accesorio. Cerciorarse de que el mismo esté firmemente sujetado antes de proceder a trabajar debajo de él. Si el aparato u accesorio fuera pesado, pedir la ayuda de otra persona para moverlo.

- El simbolo IEC417 que aparece en el equipo significa que el manual contiene informaciones para evitar lesiones personales o daños al equipo. Obsérvense y préstese atención a toda las notas de ADVERTENCIA presentes en los manuales y en el equipo. Las ADVERTENCIAS sirven para llamar la atención sobre informaciones de seguridad para el personal.

- Reemplazar los fusibles únicamente con otros del mismo tipo y capacidad, según lo indique el rótulo en el equipo y la descripción en el manual.

CAUTIONS

- Observe and heed all CAUTION notices in the manuals and on the equipment. CAUTIONS call attention to information about safeguarding *equipment* from damage.

HANDLING PRECAUTIONS FOR ELECTRONIC DEVICES SUBJECT TO DAMAGE BY STATIC ELECTRICITY

Place instrument or module to be serviced, spare parts in conductive (anti–static) envelopes or carriers, hand tools etc. on a work surface defined as follows. The work surface must be conductive and reliably connected to earth ground through a safety resistance of approximately 250 kilohms. The surface must **NOT** be metal. (A resistivity of 30 to 300 kilohms per square inch is suggested.) Avoid placing tools or electrical parts on insulators.

Ground the frame of any line–powered equipment, test instruments, lamps, soldering irons, etc., directly to earth ground. To avoid shorting out the safety resistance, be sure that grounded equipment has rubber feet or other means of insulation from the work surface. The module being serviced should be insulated while grounded through the power–cord ground wire, but must be connected to the work surface before, during and after any disassembly or other procedure in which the line cord is disconnected.

Exclude any hand tools (such as non–conductive plunger–type solder suckers) that can generate a static charge.

Ground yourself reliably, through a resistance, to the work surface; use, for example, a conductive strap or cable with a wrist cuff. The cuff must make electrical contact directly with your skin; do **NOT** wear it over clothing. (Resistance between skin contact and work surface through a commercially available personnel grounding device is typically 250 kilohms to 1 megohm.)

If any circuit or IC packages are to be stored or transported, enclose them in conductive envelopes or carriers. Remove them only with the above precautions; handle IC packages without touching the contact pins.

Avoid circumstances that are likely to produce static charges, such as wearing clothes of synthetic material, sitting on a plastic–covered stool (particularly while wearing wool), combing your hair, or making extensive erasures. *These circumstances are most significant when the air is dry.*

When testing static sensitive devices, be sure dc power is on before, during, and after application of test signals. Be sure all pertinent voltages have been switched off while boards or components are removed or inserted.

Contents

Preface

Fixturing – Section 1

1.1 Introduction 1–1
1.1.1 Third–Party Instruments 1–2
1.2 Installing and Removing the Test Fixture 1–3
1.2.1 Installing the Test Fixture 1–6
1.2.2 Removing the Test Fixture 1–7
1.3 Configuration Resource Requirements 1–8
1.4 Fixture Types 1–10
1.5 Fixture Kits 1–14
1.5.1 Fixture Vendor Requirements 1–14
1.6 Fixture Design Issues 1–15
1.6.1 Fixture Sizes 1–15
1.6.2 Adding Connectors on a Fixture 1–15
1.7 Fixture Description File (LabWindows/DOS) 1–16
1.7.1 Creating a Fixture Description File 1–18
1.7.2 Fixture Report Files 1–33
1.8 Fixture Specifications (ENCOMPASS) 1–44

1.9 VXIbus Instrument and VXIScan Scanner Cages 1–47
1.10 Fixture Wiring for Scanner Controller Functions 1–56
1.10.1 Fixture Relay Driver Wiring 1–56
1.10.2 Fixture ID Wiring 1–59
1.10.3 Fixture Position Sensing Wiring 1–60
1.10.4 Power Supply Wiring 1–61
1.11 Fixture Wiring Suggestions 1–64
1.12 Fixture Testing 1–71
1.12.1 Fixture Documentation for Wiring Check 1–71
1.12.2 Power Wiring Check 1–72
1.12.3 UUT Wiring Check: Shorts and Continuity Tests 1–72
1.12.4 Power–Up Tests 1–73
1.13 Loading the Fixture Description File 1–75

Index

Preface

Purpose

This manual provides information for designing and building a test fixture, used to test a unit under test (UUT), on a GR5000 or GR9000 test system.

Intended Reader

This manual provides information to anyone responsible for designing and building test fixtures for the GR5000 and GR9000 test system.

Related Manuals

Refer to the or your test system's instruments manual for additional information.

9029–0046	*GENEVA–Based Test and Measurement System Service Manual*
	Your test system's instruments manual

Synopsis

Section 1 – **Fixturing**

This section provides a overview of fixture concepts and the steps involved in designing and building a test fixture for the GR5000 test system.

Conventions

This manual uses the following conventions:

- *Italic* typeface displays names of manuals.
- **Bold** typeface displays commands, keys, buttons, prompts, menu options, icons, and literals within text.
- **`bold monospace`** denotes text you must enter from the keyboard.
- *`italic monospace`* indicates that you must substitute an appropriate word or value in place of the terms that appear in this font.
- **NOTE** identifies specialized information.
- **CAUTION** indicates that the result of an action could be harmful to the system.
- **WARNING** indicates that the result of an action could be harmful to the operator.
- ⊞ indicates the end of an example.

Section 1
Fixturing

1.1 Introduction

This section provides an overview of fixture concepts and the steps you must take to design and build a test fixture for testing your Unit Under Test (UUT) on the GR5000 or GR9000 test system. It covers the steps required to generate the information a fixture vendor needs to build a test fixture or for you to build a test fixture from a kit. The concepts discussed center on the two types of fixtures: bed–of–nails and edge connector. The process of creating a fixture can be divided into these six operations:

- Determine resource requirements
- Determine fixture design
- Describe fixture specifications
- Generate the fixture report
- Build the fixture
- Test the fixture

The test fixture is the test system's mechanical and electrical interface to your UUT. Each test fixture is specific to a particular UUT type and test system configuration. The test fixture may also contain additional circuity needed to test your UUT. The connectors located on top of each scanner form the receiver that the test fixture sits on (refer to Figure 1–1).

Since the completed test fixture is needed before you can begin test program checkout, it is important that you understand your configuration resource requirements before you begin to design your test fixture. Configuration resource requirements are discussed in subsection 1.3.

1.1.1 Third–Party Instruments

Fixturing information for third–party instruments that you purchase from GenRad is included the third–party instrument kit, which contains the following:

- Third–party instrument module with manufacturer's documentation
- A .doc file, which contains detailed information on adaptor wiring and scanner connections
- An .iid file, which describes how the instrument connects to its particular type of scanner.

1.2 Installing and Removing the Test Fixture

The test system's instrument bay includes a receiver, which is a shallow rectangular frame, located above the VXIscan scanner cage. Scanners in the scanner cage extend up through the receiver and interface directly with the connectors on the bottom of the test fixture. Refer to Figure 1–1 for a representative illustration of the relationship of the receiver, test fixture, and the fixture interfaces.

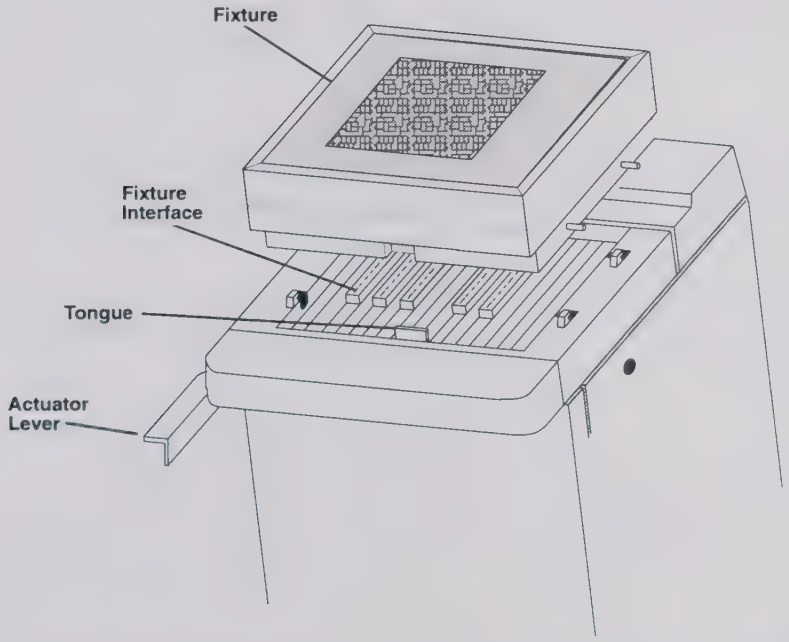


Figure 1–1. The Receiver, the Test Fixture, and the Fixture Interfaces

The receiver has four hold–down hooks to secure the test fixture. These hooks are operated in unison by an actuator lever located at the upper left corner of the front of the instrument bay. The actuator lever must be raised to open the hold–down hooks, which receive the hold–down bars of the test fixture.

A tongue protrudes up from the receiver, near the middle of its front edge. A slot in the test fixture fits over this tongue, which serves as a guide and a stop to assist you when installing the test fixture. Refer to Figure 1–2 for a warning posted near the actuator lever.

WARNING

DANGER OF PINCHING. DO NOT TOUCH RECEIVER HOLD DOWN HOOKS WHILE MOVING THE RECEIVER ACTUATOR HANDLE. MOVE HANDLE TO DOWN POSITION WHEN NO FIXTURE IS INSTALLED.

ATTENTION

DANGER DE SE FAIRE PINCER. NE PAS TOUCHER LE RÉCEPTEUR. MAINTENEZ LES CROCHETS EN BAS PENDANT LA MANIPULATION DU DISPOSITIF DE COMMANDE DU RÉCEPTEUR. FAITES BASCULER LE DISPOSITIF DE COMMANDE EN POSITION BASSE LORSQU'AUCUN DISPOSITIF DE SERRAGE N'EST INSTALLE.

WARNUNG

EINKLEMMGEFAHR. EMPFÄNGER NICHT BERÜHREN. HAKEN WÄHREND DER HANDHABUNG DES EMPFÄNGERSH ALTGRIFFS HINUNTERDRÜKEN. GRIFF IN DIE UNTEN–POSITION BRINGEN, WENN KEINE SPANNVORRICHTUNG INSTALLIERT IST.

AVISO

PERICO DE DANO POR PRENDIMENTO. NÃO TOQUE OS GANCHOS QUE PRENDEM O RECEPTOR AO MOVER O CABO DO ATUADOR DO RECEPTOR. MOVA O CABO PARA A POSIÇÃO PARA BAIXO QUANDO NÃO ESTIVER INSTALADO NENHUM DISPOSITIVO.

ADVERTENCIA

HAY PELIGRO DE PINCHAR EL CABLE. NO TOCAR LOS GANCHOS DE SUJECION DEL RECEPTOR MIENTRAS SE MUEVE LA MANIJA ACTUADORA DEL MISMO. CORRER LA MANIJA A UNA POSICION HACIA ABAJO CUANDO NO HAY ACCESORIOS INSTALADOS.

Figure 1–2. Warning Posted on the Instrument Bay

1.2.1 Installing the Test Fixture

NOTE	Excessive force should not be used to engage the test fixture. If does not engage easily, examine the receiver shelf and fixture interface for any type of obstruction.

To install the test fixture, perform the following:

1. Raise the actuator lever. This action raises the receiver's hold–down hooks.
2. Handling the test fixture carefully so that you do not hurt yourself nor damage any connector pins, position the test fixture properly on the receiver using the receiver's tongue as an alignment aid.
3. Press the thumb release beside the actuator lever and push the lever downward to lock the test fixture in position. Be sure that the receiver's hold–down hooks engage the four hold–down bars on the sides of the test fixture.

1.2.2 Removing the Test Fixture

To remove the test fixture, perform the following:

1. Raise the actuator lever. This action raises the receiver's hold–down hooks.
2. Handling the test fixture carefully so that you do not hurt yourself nor damage any connector pins, lift the test fixture making sure that its hold–down bars disengage from the receiver's hold–down hooks.
3. Press the thumb release beside the actuator lever and push the lever downward to lower the receiver's hold–down hooks.

The test fixture has exposed connector pins on its bottom surface. To prevent damage to the connector pins, be sure to observe the following precautions:

- When you store the test fixture, be sure that the connector pins do not bump or press against any solid object.
- When you lift the test fixture, keep your hands away from the connector pins.
- When you place the test fixture on the receiver, use care to safeguard the connector pins.

NOTE Raising the actuator lever activates the safety interlock switch that takes the UUT Power Supplies off line. To recover, you must restart your test program to reprogram your UUT Power Supplies.

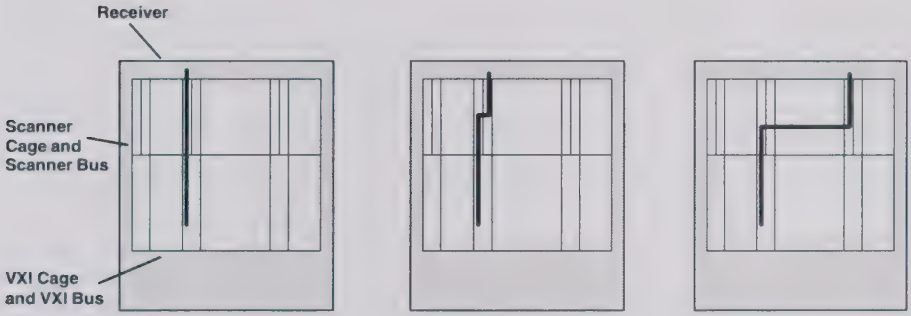
1.3 Configuration Resource Requirements

Before you can have a fixture built you must analyze each test and determine the appropriate scanner and instrument requirements. The configuration resource requirements you need to determine are:

- The types of testing required for your UUT
- The instruments your testing requires and their instrument lead names
- The scanners the instruments require and their UUT terminal names
- The UUT signal names your testing needs to access
- The special features your testing has that require special options or configurations
- The fixture type required: edge connector or bed–of–nails
- The best possible or available connections between your UUT and the scanner, which are listed here in order of preference and illustrated in Figure 1–3:
  - Directly to the scanner above the instrument your test requires

    Some types of scanners are restricted to using only this type of connection, because they do not have the capability to use scanner bus lines.
  - To the same scanner type in another slot
  - To a different, but compatible, scanner either directly above or in another slot

In the following illustration, the Slot 0 instrument is in slot 0 and there are two other instruments in slots 3 and 10. The scanner controller is in slot V0 and there are three other scanners in slots V3, X3, and V10. The scanners in slots V3 and X3 are the same type.



The solid line represents the scanner connection path.

1

A Scanner connection to the receiver connector directly above the instrument (to the V scanner slot with the same number of the VXI instrument slot) is best, because it provides the shortest connection and because it does not use valuable scanner bus lines.

2

A scanner connection to the scanner of the same type in another slot is second best, because it is often easier to make connections if the scanners are symmetrical.

3

A scanner connection to a compatible scanner in another slot is the final choice.

Figure 1–3. Possible Scanner Connections (front view)

Special considerations:

- Does the configuration require short wire lengths to the UUT?

You may find it helpful to draw a schematic representation of the connections required for each test type while planning your configuration resource requirements. You might want to start with simplified diagrams of resistors and loads and build up to a diagram of complex scanner connections.

1.4 Fixture Types

The GR5000 and GR9000 test systems support both card–edge connector and bed–of–nails interfaces. The primary components of the fixture are:

- Fixture Frame/Assembly
- Power module connector
- Multiple signal module connectors
- UUT interface (card–edge or bed–of–nails)

The fixture's frame and associated connector modules interface to the test system's receiver and mating scanner connector assemblies. Mounted to the frame is the fixture housing assembly which contains all wiring, any external loads or interface circuits and a UUT ground plane. Mounted to the top of the fixture housing is the UUT interface which can be a card–edge interface or a vacuum actuated bed–of–nails.

All test fixtures have a top assembly that mates with the UUT, a bottom assembly that mates with the test system's receiver, and routing between the top and bottom assemblies. A typical bed–of–nails test fixture interface connects a UUT node to a pin in the receiver, as shown in Figure 1–4. A test point generally consists of a nail, an interface pin, and interconnecting wire.

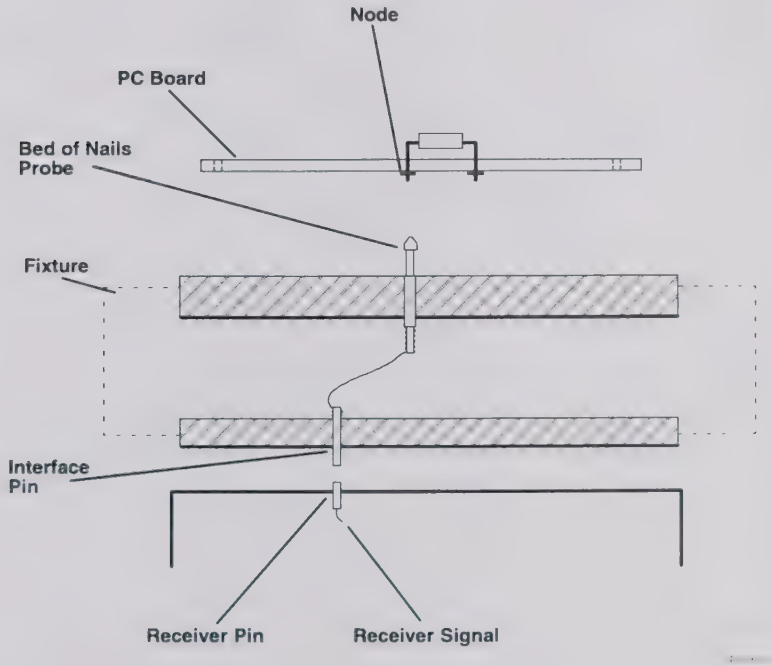


Figure 1–4. Components of a Bed–of–Nails Fixture Test Point

The edge–connector test fixture shown in Figure 1–5 limits electrical access to the connector pins that would be available to the UUT's normal–use environment. The edge–connector test fixture is the type more commonly used for functional testing.

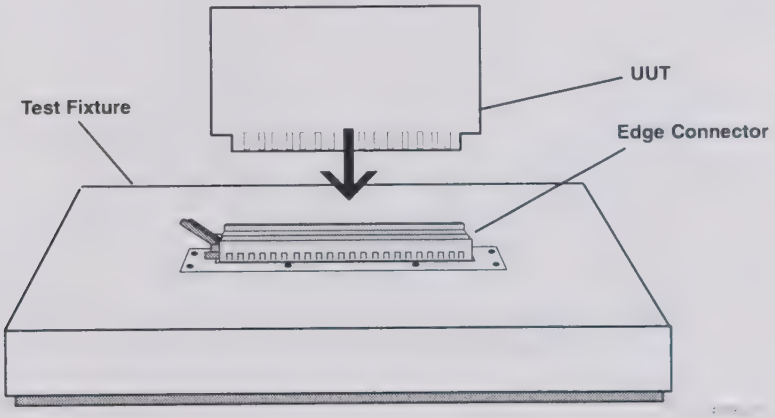


Figure 1–5. Typical Edge–Connector Test Fixture

In the bed–of–nails test fixture shown in Figure 1–6, the flat bottom of the UUT (usually with no components on the bottom) is pulled down by vacuum onto the bed–of–nails probes that make mechanical and electrical contact with the UUT nodes.

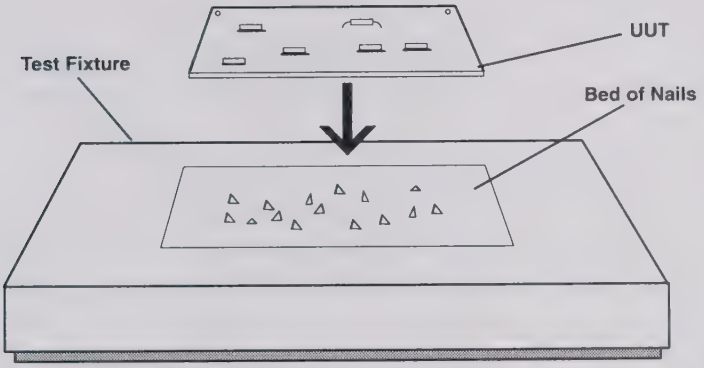


Figure 1–6. Typical Bed–of–Nails Fixture

1.5 Fixture Kits

Most users purchase an assembled/wired test fixture. Contact your GenRad sales office for a list of qualified fixture manufacturers.

These vendors have fixtures that are specifically designed for the GenRad GENEVA test systems. You can purchase a test fixture that is already assembled, wired, and ready for use or you can purchase the test fixture kit and assemble and wire the fixture yourself.

1.5.1 Fixture Vendor Requirements

If you plan to have a fixture vendor build your fixture, you will want to provide the following items and any others they might request:

- Fixture Report files
- Sketch or drawing showing UUT mounting position
- Mating connectors
- Mechanical drawings of UUT
- Identification of all special external loads and circuitry
- Drilling information for a bed–of–nails fixture

1.6 Fixture Design Issues

The design and construction of a UUT influences the design of the test fixture used to test the UUT. For example, a bed–of–nails fixture might be used for the following reasons:

- High throughput

  If ease of installing and removing the UUT is a factor for a large size, large quantity production UUT that requires high throughput.

- Limited access

  If the UUT's design limits access to the edge connector.

1.6.1 Fixture Sizes

The size of the fixture is determined by the Interface Test Adapter (ITA) frame assembly which is approximately 17.69 in. wide x 15.12 in. deep (44.93 cm x 38.40 cm).

1.6.2 Adding Connectors on a Fixture

Multiple UUT connectors can be installed in a bed–of–nails fixture or on an edge–connector fixture. The additional connectors may accommodate the following:

- A pc–board that has connectors in addition to the primary edge connector, where external wiring would be installed between the additional connector on the pc–board to the additional connector on the fixture
- A second well
- An edge connector addition to a bed–of–nails fixture
- Other combinations, such as multiple boards tested in the same well

1.7 Fixture Description File (LabWindows/DOS)

This subsection describes creating a fixture description file on a GR5000 or GR9000 running LabWindows/DOS. For information about describing fixture specifications on a GR5000 or GR9000 running GenRad's ENCOMPASS test management system, refer to subsection 1.8.

The Fixture Description File (.FXD) is an ASCII file where you describe the connections between your test system's scanners and your UUT in terms of how your UUT signal names map to a scanner UUT terminal name at the receiver. The Fixture Description File is used to create the Fixture Report files used for building a test fixture and it is also used by the scanner software at test program run time.

The connections in the Fixture Description File are specified as the scanner UUT terminal names for your test system's instrument connections and UUT signal names for your UUT's connections.

Scanner UUT Terminal Name

A scanner UUT terminal name is defined by its slot location and its scanner signal name. The scanner slots are named V0 through V12 and X0 through X12, where the V slots are directly over the corresponding VXI slot numbers, and the X slots are just to the right of them. The scanner signal names are specific to a scanner type. Refer to your test system's instruments manual for a complete list of the scanner signal names. A scanner UUT terminal name is a required entry in the Fixture Description File. An example of a scanner UUT terminal name is: V2.telcom1a.

UUT Signal Name

The UUT signal name is the name you assign to either a UUT node name or to a UUT part name and pin number (part.pin) in your test program. Examples of UUT node names are: tip, N1, and 1A+. Examples of UUT part.pin names are: U1.1 and J1.1A. The UUT signal name is required in the Fixture Description File (.FXD) and maps to a scanner UUT terminal name connected to the UUT at the receiver. A UUT node name can also map to one or more part.pin name.

You must create a Fixture Description File for each unique UUT type you are testing. The Fixture Description File has two main components: the fixture attribute section and the fixture well section.

Fixture Attribute Section

The fixture attribute section is where you describe the overall fixture attributes, such as fixture type, part number, and wire type. This section is preceded by the %fixture keyword. Refer to subsection 1.7.1 for more details.

Fixture Well Section

The GR5000 test system supports up to two well sections, labeled "1" and "2". Each well section describes a separate section of the fixture. You can use two wells for testing multiple UUTs alternately, to improve throughput.

The fixture well section is where you describe the connections between your test system's instruments and your UUT in terms of how your UUT signal names map to a scanner UUT terminal name at the receiver. This section also describes your power supply connections. This section is preceded by the %well keyword. Refer to subsection 1.7.1 for more details.

Syntax Rules

Comments may be placed anywhere within the Fixture Description File. They must be preceded by two forward slashes (//) and are terminated at the end of the line of text. All entries in the Fixture Description File are case insensitive.

1.7.1 Creating a Fixture Description File

Before you begin to describe your instrument and scanner connections in a Fixture Description File, you may run the FXDATA program to help you create a Fixture Description File. FXDATA uses your test system's configuration for creating a template fixture attribute section (%fixture) and fixture well section (%well). FXDATA can only be run on a PC connected to the test system; however, you can edit the file it creates off–line.

To create the Fixture Description template file type from the DOS prompt:

```
>FXDATA filename.FXD
```

where:

filename.FXD is the name of the output file. If a file with that name already exists, FXDATA will exit with the following error message:

```
File already exists : filename.FXD
```

Refer to the Fixture Description template file shown in Figure 1–7. In this example, only a few automatically–generated fixture attribute labels appear in the %fixture section, and the %well section contains only scanner signal locations. The lines in the %fixture section, above the Fixture Attributes label, come from the template file shown in Figure 1–8 and are described in this subsection. All other information was derived from the hardware configuration of the test system FXDATA was run on.

You can customize the information FXDATA uses for the fixture attribute section by creating a separate fixture attribute section template file and running FXDATA with the file override switch, as follows:

```
>FXDATA [-t attribute_template_file] filename.FXD
```

where:

-t attribute_template_file is the name of the fixture attribute section file you created.

filename.FXD is the name of the output file. If a file with that name already exists, FXDATA will exit with the following error message:

```
File already exists : filename.FXD
```

The contents of this file will be inserted immediately after the %fixture label in the fixture description template file FXDATA produces.

Since lines beginning with a comment string in your Fixture Description File are ignored by FXREPORT, they will not appear in your Fixture Report files. If you want to transfer comment–type text to the Fixture Report files, start the text line with a colon (:). Comments embedded within a line will appear in the Fixture Report files.

FXDATA will also insert configuration information, read from the GR5000 test system on which it is run, into the fixture attribute section.

Refer to Figure 1–8 for an example of a customized fixture attribute section of a Fixture Description File. This file was used to create the Fixture Description File template in Figure 1–7.

```
// filename: example.fxd
// created on: Wed Jan 29 11:55:28 1992

// This file describes the fixture in a form accessible to programs.
// The data is required at runtime, and can be used to create reports.
// This file is only a template based on the local GENEVA-based test
// system. You must customize it to create the fixture for your uut.

%fixture

UUT:

Fixture type:
Fixture type.part number:
Fixture type.option:
Fixture type.wire:

Fixture Attributes
Fixture Date: Wed Jan 29 11:55:29 1992

Fixture ID:

Tester Requirements
Scanner Slot: V1   digital
Scanner Slot: V4   digital
Scanner Slot: V6   telcom
Scanner Slot: V7   telcom

Instrument Slot:   1 DSI DOC
Instrument Slot:   4 UTI DOC
Instrument Slot:   6 AWG DOC
Instrument Slot:   7 WFD DOC

Power Supply: P1.PS1 7.0 volts 15.0 amps
Power Supply: P1.PS2 7.0 volts 15.0 amps
Power Supply: P1.PS4 60.0 volts 2.5 amps

%well 1
```

Figure 1–7. Sample Output File from FXDATA (Page 1 of 3)

Page 2	Page 3	Page 4	Page 5
V1.uut1	V1.uut41	V4.uut17	V4.uut56
V1.uut2	V1.uut42	V4.uut18	V4.uut57
V1.uut3	V1.uut43	V4.uut19	V4.uut58
V1.uut4	V1.uut44	V4.uut20	V4.uut59
V1.uut5	V1.uut45	V4.uut21	V4.uut60
V1.uut6	V1.uut46	V4.uut22	V4.uut61
V1.uut7	V1.uut47	V4.uut23	V4.uut62
V1.uut8	V1.uut48	V4.uut24	V4.uut63
V1.uut9	V1.uut49	V4.uut25	V4.uut64
V1.uut10	V1.uut50	V4.uut26	V6.ZA1
V1.uut11	V1.uut51	V4.uut27	V6.ZA2
V1.uut12	V1.uut52	V4.uut28	V6.ZA3
V1.uut13	V1.uut53	V4.uut29	V6.ZA4
V1.uut14	V1.uut54	V4.uut30	V6.ZA5
V1.uut15	V1.uut55	V4.uut31	V6.ZA6
V1.uut16	V1.uut56	V4.uut32	V6.ZA7
V1.uut17	V1.uut57	V4.uut33	V6.ZA8
V1.uut18	V1.uut58	V4.uut34	V6.ZACOM
V1.uut19	V1.uut59	V4.uut35	V6.ZA9
V1.uut20	V1.uut60	V4.uut36	V6.ZA10
V1.uut21	V1.uut61	V4.uut37	V6.ZA11
V1.uut22	V1.uut62	V4.uut38	V6.ZA12
V1.uut23	V1.uut63	V4.uut39	V6.ZA13
V1.uut24	V1.uut64	V4.uut40	V6.ZA14
V1.uut25	V4.uut1	V4.uut41	V6.ZA15
V1.uut26	V4.uut2	V4.uut42	V6.ZA16
V1.uut27	V4.uut3	V4.uut43	V6.TELCOM1A
V1.uut28	V4.uut4	V4.uut44	V6.TELCOM2A
V1.uut29	V4.uut5	V4.uut45	V6.TELCOM3A
V1.uut30	V4.uut6	V4.uut46	V6.TELCOM4A
V1.uut31	V4.uut7	V4.uut47	V6.TELCOM5A
V1.uut32	V4.uut8	V4.uut48	V6.TELCOM6A
V1.uut33	V4.uut9	V4.uut49	V6.TELCOM7A
V1.uut34	V4.uut10	V4.uut50	V6.TELCOM8A
V1.uut35	V4.uut11	V4.uut51	V6.TELCOM9A
V1.uut36	V4.uut12	V4.uut52	V6.TELCOM10A
V1.uut37	V4.uut13	V4.uut53	V6.TELCOM11A
V1.uut38	V4.uut14	V4.uut54	V6.TELCOM12A
V1.uut39	V4.uut15	V4.uut55	V6.TELCOM13A
V1.uut40	V4.uut16	V4.uut56	

Figure 1–7. Sample Output File from FXDATA (Page 2 of 3)

Page 6	Page 7	Page 8
V6.TELCOM14A	V6.TELCOM17B	V7.TELCOM19A
V6.TELCOM15A	V6.TELCOM18B	V7.TELCOM20A
V6.TELCOM16A	V6.TELCOM19B	V7.ZB1
V6.TELCOM17A	V6.TELCOM20B	V7.ZB2
V6.TELCOM18A	V7.ZA1	V7.ZB3
V6.TELCOM19A	V7.ZA2	V7.ZB4
V6.TELCOM20A	V7.ZA3	V7.ZB5
V6.ZB1	V7.ZA4	V7.ZB6
V6.ZB2	V7.ZA5	V7.ZB7
V6.ZB3	V7.ZA6	V7.ZB8
V6.ZB4	V7.ZA7	V7.ZBCOM
V6.ZB5	V7.ZA8	V7.ZB9
V6.ZB6	V7.ZACOM	V7.ZB10
V6.ZB7	V7.ZA9	V7.ZB11
V6.ZB8	V7.ZA10	V7.ZB12
V6.ZBCOM	V7.ZA11	V7.ZB13
V6.ZB9	V7.ZA12	V7.ZB14
V6.ZB10	V7.ZA13	V7.ZB15
V6.ZB11	V7.ZA14	V7.ZB16
V6.ZB12	V7.ZA15	V7.TELCOM1B
V6.ZB13	V7.ZA16	V7.TELCOM2B
V6.ZB14	V7.TELCOM1A	V7.TELCOM3B
V6.ZB15	V7.TELCOM2A	V7.TELCOM4B
V6.ZB16	V7.TELCOM3A	V7.TELCOM5B
V6.TELCOM1B	V7.TELCOM4A	V7.TELCOM6B
V6.TELCOM2B	V7.TELCOM5A	V7.TELCOM7B
V6.TELCOM3B	V7.TELCOM6A	V7.TELCOM8B
V6.TELCOM4B	V7.TELCOM7A	V7.TELCOM9B
V6.TELCOM5B	V7.TELCOM8A	V7.TELCOM10B
V6.TELCOM6B	V7.TELCOM9A	V7.TELCOM11B
V6.TELCOM7B	V7.TELCOM10A	V7.TELCOM12B
V6.TELCOM8B	V7.TELCOM11A	V7.TELCOM13B
V6.TELCOM9B	V7.TELCOM12A	V7.TELCOM14B
V6.TELCOM10B	V7.TELCOM13A	V7.TELCOM15B
V6.TELCOM11B	V7.TELCOM14A	V7.TELCOM16B
V6.TELCOM12B	V7.TELCOM15A	V7.TELCOM17B
V6.TELCOM13B	V7.TELCOM16A	V7.TELCOM18B
V6.TELCOM14B	V7.TELCOM17A	V7.TELCOM19B
V6.TELCOM15B	V7.TELCOM18A	V7.TELCOM20B
V6.TELCOM16B		

Figure 1–7. Sample Output File from FXDATA (Page 3 of 3)

```
// template.fxd
// template file for fxdata
UUT:

Fixture type:
Fixture type.part number:
Fixture type.option:
Fixture type.wire:
```

Figure 1–8. Sample Customized Fixture Attribute Section

Fixture Attribute Section

The fixture attribute section is where you describe the overall fixture attributes, such as fixture type, part number, and wire type. The fixture attribute section you create is for use when building your fixture. It is not used by the `ScanLoadFixture` function unless you have a line in the %fixture section of the form: Fixture ID number; in which case, the `ScanLoadFixture` function will check that the fixture ID read from the UUT matches the one you have in your %fixture section. If a mismatch exists, an error is reported.

The entries in this section have the form:

```
label : data
```

where:

label is the template question.

data is the detailed fixture attribute information that you want included in the Fixture Report files.

The number of dots in the label name control report formatting. For example, label.label.label will be indented further than label.label in the Fixture Report files.

Table 1–1 contains a list of possible fixture attributes you may want to provide to your fixture vendor or those that a fixture vendor might request.

Figure 1–9 shows a sample Fixture Description File after specific UUT information has been filled in.

Table 1–1
Fixture Attribute Labels

Label	Description
UUT:	The UUT name
Fixture date:	The date associated with the Fixture Description File is automatically filled in
Fixture type:	The fixture type, edge or bed–of–nails
Fixture type.part number:	The fixture part number
Fixture type.option:	Fixture options, specific to fixture vendor
Fixture type.wire:	Description of the wire to be used in fixture
Fixture type.probe:	Description of probe type to be used (BON)
Fixture well:	Well id and minimum and maximum associated scanner slot (for a dual–well bed–of–nails fixture only)
Fixture id:	The fixture id label is automatically provided
Fixture down switch:	Switch name, side, and connector pin to be wired to (for bed–of–nails fixture only)
Fixture ground plane connections:	Part.pins to be connected to the ground plane
Scanner slot:	Automatically filled in with configuration information for each scanner board present
Instrument slot:	Automatically filled in with configuration information for each instrument slot filled
Power supply:	Automatically filled in with configuration information for each power supply present

Table 1–1 (continued)
Fixture Attribute Labels

Label	Description
UUT power:	Power supply name
UUT power.direction:	Positive or negative power
UUT power.source node:	Name of UUT source node on this supply
UUT power source connections:	Names of part.pins to be tied to power source pin.
UUT power source sense connections:	Names of part.pins to be tied to power source sense pin
UUT power return node:	Name of UUT return node on this supply
UUT power return connections:	Names of part.pins to be tied to power return pin
UUT power return sense connections:	Names of part.pins to be tied to power return sense pin

Fixture Well Section

The fixture well section is where you describe the connections between your test system's scanners and your UUT in terms of how your UUT signal names map to a scanner UUT terminal name at the receiver. The fixture well section also describes your power supply connections.

The %well label marks the beginning of your fixture well section and must be followed by a number that identifies the port number of the multi–ported fixture that fixture well section defines. If there is only a single well use %well 1.

Example

```
%well 1

%well 2
```

The number 1 indicates that the scanner to UUT mapping listed in this fixture well section is for the first port of a dual–ported fixture. The number 2 indicates that the scanner to UUT mapping is for the second port of a dual–ported fixture.

Figure 1–9 shows a sample Fixture Description File after specific UUT information has been filled in.

The fixture well section contains entries of the form:

UUT_terminal_name node_name [part.pin_names]

where:

UUT_terminal_name is required data for each record.

If the *node_name* is missing, the record will be considered empty and will be ignored.

You can mark the *part.pin* name to which the fixture wire is actually connected to by using a leading #. Although the list of part names and pin numbers is optional, GenRad recommends you use them since they will help your fixture vendor wire your fixture.

The fixture well section has one other type of entry called the power description record.

A power description record informs the test system of either the renaming of power supply modules, the creation of virtual supplies, or both. This record must be placed in the fixture well section of the Fixture Description File (.FXD).

You may use multiple power description records. One record must be used for each occurrence of a renamed power supply module. One record must be used when you create a virtual supply.

The syntax of the power description record is as follows:

```
.POWER P1.virtual_name power_type power_supply_names
```

where:

virtual_name refers to the name being assigned to the combination of power supply modules. When you rename a power supply module, *virtual_name* refers to its new name.

power_type refers to the arrangement of the power supply names in the following list. The entry must be one of these choices: SERIES, PARALLEL, or SINGLE. SERIES or PARALLEL is used when you combine two or more power supply modules; SINGLE is used when you rename a power supply module.

power_supply_names is a comma–separated list of power supply modules or previously defined virtual supplies. Each entry is composed of a programmable power supply cage name and power supply name separated by a period; for example, P1.PS2.

The power description record is used by the test system at run–time to define power supply names and to check that the test system power supply configuration is compatible with the power requirements in the Fixture Description File.

Syntax Rules

The following syntax rules apply to the fixture well section. All identifiers in the fixture well section are case insensitive. Identifiers cannot contain any of the following characters:

- period (.)

  The period character is reserved as a separator, as in part.pin, instrument.lead, slot.signal, and slot.connector_pin.

- colon (:)
- percent (%)
- space
- two slashes (//)

```
// Filename: example.fxd
// Created on: Tue Nov 19 13:54:30 1991

%fixture

UUT: example

Fixture type: edge
Fixture type.part number: 0000-0000
Fixture type.option: anti-static
Fixture type.wire: 28 ga 3-5 twists/in. twisted pair (unless noted)

:Fixture Attributes

Fixture date:  Tue Nov 19 13:54:30 1991
Fixture ID: 1

:Tester Requirements

Scanner Slot: V4 digital
Scanner Slot: V6 telcom
Scanner Slot: V7 telcom

Instrument Slot: 4 uti doc
Instrument Slot: 6 awg doc
Instrument Slot: 7 wfd doc

Power Supply: P1.PS1 7.0 volts 15.0 amps
Power Supply: P1.PS2 7.0 volts 15.0 amps
Power Supply: P1.PS4 60.0 volts 2.5 amps

%well 1
.POWER P1.COMBO  SERIES P1.PS1, P1.PS2
P1.PS1I-         UUTGND
P1.PS1S-         UUTGND
P1.PS1I+         P1.PS2I-
P1.PS1S+         P1.PS2S-
P1.PS2I-         P1.PS1I+
P1.PS2S-         P1.PS1S+
P1.PS2I+         PLUS 14
P1.PS2S+         PLUS 14
```

Figure 1–9. Sample .FXD File Describing a Specific UUT Fixture (Page 1 of 3)

```
P1.PS4I-          NEG48VDC
P1.PS4S-          NEG48VDC
P1.PS4I+          UUTGND
P1.PS4S+          UUTGND
//
// signal connections to the codec/digital interconnect scanner
// clock, frame, and sync code signals
V4.uut19          CLK_2048     //CLKFRM0
V4.uut20          FRAME_8KHZ   //CLKFRM1
//
// pcm data in and out signals
V4.uut25          RXV_PCM      //PCMIN0
V4.uut29          XMIT_PCM     //PCMOUT0
//
// telecom differential scanner located over the AWG
V6.telcom19a            BYPASSCAPC2_A
V6.telcom19b            BYPASSCAPC1_B
V6.telcom20a            BYPASSCAPC1_A
V6.telcom20b            BYPASSCAPC2_B
//
// Loads and termination networks
V6.za1            AWG_LOAD1_A
V6.zb1            AWG_LOAD1_B
V6.za2            AWG_LOAD2_A
V6.zb2            AWG_LOAD2_B
V6.zacom          AWG_LOADCOM_A
V6.zbcom          AWG_LOADCOM_B
//
// telecom differential scanner located over the WFD
V7.telcom1a       TIP1         J1.1
V7.telcom1b       RING1        J1.2
V7.telcom2a       TIP2         J1.3
V7.telcom2b       RING2        J1.4
V7.telcom3a       TIP3         J1.5
V7.telcom3b       RING3        J1.6
V7.telcom4a       TIP4         J1.7
V7.telcom4b       RING4        J1.8
V7.telcom5a       TIP5         J1.9
V7.telcom5b       RING5        J1.10
V7.telcom6a       TIP6         J1.11
```

Figure 1–9. Sample FXD File Describing a Specific UUT Fixture (Page 2 of 3)

```
V7.telcom6b     RING6       J1.12
V7.telcom7a     TIP7        J1.13
V7.telcom7b     RING7       J1.14
V7.telcom8a     TIP8        J1.15
V7.telcom8b     RING8       J1.16
//
// ports 9 - 16 are not used with this uut
//
V7.telcom17a    TESTBUSIN_A
V7.telcom17b    TESTBUSIN_B
V7.telcom18a    TESTBUSOUT_A
V7.telcom18b    TESTBUSOUT_B
V7.telcom19a    BYPASSCAPC3_A
V7.telcom19b    BYPASSCAPC4_B
V7.telcom20a    BYPASSCAPC4_A
V7.telcom20b    BYPASSCAPC3_B
//
// Loads and termination networks
V7.za1          ZCO_LOADA
V7.za12         R100_OHM
V7.za13         R200_OHM
V7.za14         R2000_OHM
V7.zacom        WFD_LOADCOMA
V7.zb1          ZCO_LOADB
V7.zbcom        WFD_LOADCOMB
```

Figure 1–9. Sample FXD File Describing a Specific UUT Fixture (Page 3 of 3)

1.7.2 Fixture Report Files

The Fixture Report files use the Fixture Description File and several sorting options to produce a report that describes all aspects of the fixture for you and the fixture vendor.

Creating Fixture Report Files

To create Fixture Report files, type from the DOS prompt:

```
>FXREPORT [/sort_option] input_file.FXD [output_file]
```

where:

`[/sort_option]` indicates the sorting option you want to use. The default format, with no sort options specified, is to sort the body of the report in the order of the Fixture Description File, and to produce the Fixture Report files with the extension .FXR. Refer to Figure 1–10 for a sample Fixture Report in default format.

input_file is the name of your input .FXD file

`[output_file]` is the name you want to give the output file. If you do not specify an output file name, FXREPORT will produce an output file with the same root name as the input file, but with a file extension modified by the type of sort option you use to produce the report.

FXREPORT looks for scanner slot lines from the %fixture section of the Fixture Description File to identify the scanner type and to fill in the corresponding Connector Pin column of the Fixture Report files. Scanner slot lines have the following format:

```
Scanner Slot: slot_name scanner_type
```

The scanner slot lines are automatically created if you use FXDATA to create your Fixture Description File template on your test system. If your Fixture Description File does not contain scanner slot lines, FXREPORT attempts to find this information by reading the test system's current hardware configuration. If FXREPORT fails to find the scanner type information for a scanner module, it leaves the Connector Pin column of the Fixture Report files blank.

Fixture Report File Sorting Options

/s slot

This option produces a report with the fixture well section sorted in the order of the test system receiver, with leftmost slot numbers first. Within a slot, information for connecters on the A side come before the B side, and connector pin numbers are sorted top to bottom (pin 75 – pin 1). The default file extension is .FXS. Refer to Figure 1–11.

/s node

This option produces a report with the fixture well section in alphabetical order by node name. The default file extension is .FXN.

/s component[=name]

This option produces a report with the fixture well section in alphabetical order by UUT component name. Since there are typically several component pins on each UUT node, this output format produces many duplicate lines. The component=name option produces a report with the fixture well section listing only those entries for a specific UUT component. The default file extension is .FXC. Refer to Figure 1–12.

In addition to the sorting order, you may specify the report output format as either 80 or 132 columns wide.

/n

This option produces an output report at 80 characters wide, which is the default.

/w

This option produces an output report at 132 characters wide.

```
GENEVA FIXTURE REPORT

Report Name: example.fxr
Report Format: default
Report Date: Wed Jan 29 13:01:38 1992

UUT:  example

Fixture type:  edge
    part number:  0000-0000
    option:  anti-static
    wire:  28 ga 3-5 twists/in. twisted pair (unless noted)

Fixture Attributes

Fixture date:   Tue Nov 19 13:54:30 1991
Fixture ID:  1

Tester Requirements

Scanner Slot:  V4 digital
               V6 telcom
               V7 telcom

Instrument Slot:  4 uti doc
                  6 awg doc
                  7 wfd doc

Power Supply:  P1.PS1 7.0 volts 15.0 amps
               P1.PS2 7.0 volts 15.0 amps
               P1.PS4 60.0 volts 2.5 amps

Daisy Chain the following points together to create fixture id:
        V0.B66          GND
        V0.B64          ID2
        V0.B63          ID3
        V0.B62          ID4
        V0.B61          ID5
        V0.B60          ID6
        V0.B59          ID7
        V0.B58          ID8
        V0.B57          ID9
```

Figure 1–10. Sample Fixture Report File in Default Format (Page 1 of 3)

```
        V0.B56          ID10
        V0.B55          ID11
        V0.B54          ID12
        V0.B53          ID13
        V0.B52          ID14
        V0.B51          ID15
        V0.B50          ID16

                                                                Page: 2

Well: 1

  Connector                         Node            Component
Signal          Pin
-------- ---    ------------------------------      ---------------
P1.PS1I         P1.PB01/P1.PB02   UUTGND
P1.PS1S         P1.PB03           UUTGND
P1.PS1I+        P1.PB04/P1.PB05   P1.PS2I-
P1.PS1S+        P1.PB06           P1.PS2S-
P1.PS2I-        P1.PB07/P1.PB08   P1.PS1I+
P1.PS2S-        P1.PB09           P1.PS1S+
P1.PS2I+        P1.PB10/P1.PB11   PLUS 14
P1.PS2S+        P1.PB12           PLUS 14
P1.PS4I         P1.PB19/P1.PB20   NEG48VDC
P1.PS4S-        P1.PB21           NEG48VDC
P1.PS4I+        P1.PB22/P1.PB23   UUTGND
P1.PS4S+        P1.PB24           UUTGND
V4.uut19        A22               CLK_2048
V4.uut20        B23               FRAME_8KHZ
V4.uut25        A29               RXV_PCM
V4.uut29        A33               XMIT_PCM
V6.telcom19a    A69               BYPASSCAPC2_A
V6.telcom19b    B70               BYPASSCAPC1_B
V6.telcom20a    A71               BYPASSCAPC1_A
V6.telcom20b    B72               BYPASSCAPC2_B
V6.za1          A2                AWG_LOAD1_A
V6.zb1          B3                AWG_LOAD1_B
V6.za2          A4                AWG_LOAD2_A
V6.zb2          B4                AWG_LOAD2_B
V6.zacom        A13               AWG_LOADCOM_A
```

Figure 1–10. Sample Fixture Report File in Default Format. (Page 2 of 3)

V6.zbcom	B14	AWG_LOADCOM_B	
V7.telcom1a	A29	TIP1	J1.1
V7.telcom1b	B30	RING1	J1.2
V7.telcom2a	A31	TIP2	J1.3
V7.telcom2b	B32	RING2	J1.4
V7.telcom3a	A33	TIP3	J1.5
V7.telcom3b	B34	RING3	J1.6
V7.telcom4a	A35	TIP4	J1.7
V7.telcom4b	B36	RING4	J1.8
V7.telcom5a	A38	TIP5	J1.9
V7.telcom5b	B39	RING5	J1.10
V7.telcom6a	A40	TIP6	J1.11
V7.telcom6b	B41	RING6	J1.12
V7.telcom7a	A42	TIP7	J1.13
V7.telcom7b	B43	RING7	J1.14
V7.telcom8a	A44	TIP8	J1.15
V7.telcom8b	B45	RING8	J1.16
V7.telcom17a	A65	TESTBUSIN_A	
V7.telcom17b	B66	TESTBUSIN_B	
V7.telcom18a	A67	TESTBUSOUT_A	
V7.telcom18b	B68	TESTBUSOUT_B	
V7.telcom19a	A69	BYPASSCAPC3_A	
V7.telcom19b	B70	BYPASSCAPC4_B	
V7.telcom20a	A71	BYPASSCAPC4_A	
V7.telcom20b	B72	BYPASSCAPC3_B	
V7.za1	A2	ZCO_LOADA	
V7.za12	A20	R100_OHM	
V7.za13	A21	R200_OHM	

Page: 3

Well: 1

Connector Signal	Pin	Node	Component
V7.za14	A22	R2000_OHM	
V7.zacom	A13	WFD_LOADCOMA	
V7.zb1	B3	ZCO_LOADB	
V7.zbcom	B14	WFD_LOADCOMB	

Figure 1–10. Sample Fixture Report File in Default Format. (Page 3 of 3)

```
GENEVA FIXTURE REPORT

Report Name: example.fxs
Report Format: slot
Report Date: Wed Jan 29 13:01:18 1992

UUT:  example

Fixture type:  edge
    part number:  0000-0000
    option:  anti-static
    wire:  28 ga 3-5 twists/in. twisted pair (unless noted)

Fixture Attributes

Fixture date:   Tue Nov 19 13:54:30 1991
Fixture ID:  1

Tester Requirements

Scanner Slot:  V4 digital
               V6 telcom
               V7 telcom

Instrument Slot:  4 uti doc
                  6 awg doc
                  7 wfd doc

Power Supply:  P1.PS1 7.0 volts 15.0 amps
               P1.PS2 7.0 volts 15.0 amps
               P1.PS4 60.0 volts 2.5 amps

Daisy Chain the following points together to create fixture id: 1
        V0.B66          GND
        V0.B64          ID2
        V0.B63          ID3
        V0.B62          ID4
        V0.B61          ID5
        V0.B60          ID6
        V0.B59          ID7
        V0.B58          ID8
        V0.B57          ID9
```

Figure 1–11. Sample Fixture Report File Sorted by Slot (Page 1 of 3)

```
        V0.B56          ID10
        V0.B55          ID11
        V0.B54          ID12
        V0.B53          ID13
        V0.B52          ID14
        V0.B51          ID15
        V0.B50          ID16

                                                                    Page: 2
Well: 1

  Connector                          Node            Component
  Signal        Pin
P1.PS1I-        P1.PB01/P1.PB02    UUTGND
P1.PS1S-        P1.PB03            UUTGND
P1.PS1I+        P1.PB04/P1.PB05    P1.PS2I-
P1.PS1S+        P1.PB06            P1.PS2S-
P1.PS2I-        P1.PB07/P1.PB08    P1.PS1I+
P1.PS2S-        P1.PB09            P1.PS1S+
P1.PS2I+        P1.PB10/P1.PB11    PLUS 14
P1.PS2S+        P1.PB12            PLUS 14
P1.PS4I-        P1.PB19/P1.PB20    NEG48VDC
P1.PS4S-        P1.PB21            NEG48VDC
P1.PS4I+        P1.PB22/P1.PB23    UUTGND
P1.PS4S+        P1.PB24            UUTGND
V4.uut29        A33                XMIT_PCM
V4.uut25        A29                RXV_PCM
V4.uut19        A22                CLK_2048
V4.uut20        B23                FRAME_8KHZ
V6.telcom20a    A71                BYPASSCAPC1_A
V6.telcom19a    A69                BYPASSCAPC2_A
V6.zacom        A13                AWG_LOADCOM_A
V6.za2          A3                 AWG_LOAD2_A
V6.za1          A2                 AWG_LOAD1_A
V6.telcom20b    B72                BYPASSCAPC2_B
V6.telcom19b    B70                BYPASSCAPC1_B
V6.zbcom        B14                AWG_LOADCOM_B
V6.zb2          B4                 AWG_LOAD2_B
V6.zb1          B3                 AWG_LOAD1_B
```

Figure 1–11. Sample Fixture Report File Sorted by Slot (Page 2 of 3)

```
V7.telcom20a   A71              BYPASSCAPC4_A
V7.telcom19a   A69              BYPASSCAPC3_A
V7.telcom18a   A67              TESTBUSOUT_A
V7.telcom17a   A65              TESTBUSIN_A
V7.telcom8a    A44              TIP8           J1.15
V7.telcom7a    A42              TIP7           J1.13
V7.telcom6a    A40              TIP6           J1.11
V7.telcom5a    A38              TIP5           J1.9
V7.telcom4a    A35              TIP4           J1.7
V7.telcom3a    A33              TIP3           J1.5
V7.telcom2a    A31              TIP2           J1.3
V7.telcom1a    A29              TIP1           J1.1
V7.za14        A22              R2000_OHM
V7.za13        A21              R200_OHM
V7.za12        A20              R100_OHM
V7.zacom       A13              WFD_LOADCOMA
V7.za1         A2               ZCO_LOADA
V7.telcom20b   B72              BYPASSCAPC3_B
V7.telcom19b   B70              BYPASSCAPC4_B
V7.telcom18b   B68              TESTBUSOUT_B
V7.telcom17b   B66              TESTBUSIN_B
V7.telcom8b    B45              RING8          J1.16
V7.telcom7b    B43              RING7          J1.14
V7.telcom6b    B41              RING6          J1.12
V7.telcom5b    B39              RING5          J1.10
V7.telcom4b    B36              RING4          J1.8
V7.telcom3b    B34              RING3          J1.6

                                                                Page: 3

Well: 1

  Connector                     Node           Component
  Signal       Pin

V7.telcom2b    B32              RING2          J1.4
V7.telcom1b    B30              RING1          J1.2
V7.zbcom       B14              WFD_LOADCOMB
V7.zb1         B1               ZCO_LOADB
```

Figure 1–11. Sample Fixture Report File Sorted by Slot (Page 3 of 3)

```
GENEVA FIXTURE REPORT

Report Name: example.fxc
Report Format: component
Report Date: Wed Jan 29 13:00:42 1992

UUT:  example

Fixture type:  edge
    part number:  0000-0000
    option:  anti-static
    wire:  28 ga 3-5 twists/in. twisted pair (unless noted)

Fixture Attributes

Fixture date:   Tue Nov 19 13:54:30 1991
Fixture ID:  1

Tester Requirements

Scanner Slot:  V4 digital
               V6 telcom
               V7 telcom

Instrument Slot:  4 uti doc
                  6 awg doc
                  7 wfd doc

Power Supply:  P1.PS1 7.0 volts 15.0 amps
               P1.PS2 7.0 volts 15.0 amps
               P1.PS4 60.0 volts 2.5 amps

Daisy Chain the following points together to create fixture id: 1
        V0.B66          GND
        V0.B64          ID2
        V0.B63          ID3
        V0.B62          ID4
        V0.B61          ID5
        V0.B60          ID6
        V0.B59          ID7
        V0.B58          ID8
        V0.B57          ID9
```

Figure 1–12. Sample Fixture Report File Sorted by Component (Page 1 of 2)

```
        V0.B56          ID10
        V0.B55          ID11
        V0.B54          ID12
        V0.B53          ID13
        V0.B52          ID14
        V0.B51          ID15
        V0.B50          ID16

                                                                Page: 2

Well: 1

  Connector                          Node            Component
  Signal        Pin

V7.telcom1a     A29                  TIP1            J1.1
V7.telcom1b     B30                  RING1           J1.2
V7.telcom2a     A31                  TIP2            J1.3
V7.telcom2b     B32                  RING2           J1.4
V7.telcom3a     A33                  TIP3            J1.5
V7.telcom3b     B34                  RING3           J1.6
V7.telcom4a     A35                  TIP4            J1.7
V7.telcom4b     B36                  RING4           J1.8
V7.telcom5a     A38                  TIP5            J1.9
V7.telcom5b     B39                  RING5           J1.10
V7.telcom6a     A40                  TIP6            J1.11
V7.telcom6b     B41                  RING6           J1.12
V7.telcom7a     A42                  TIP7            J1.13
V7.telcom7b     B43                  RING7           J1.14
V7.telcom8a     A44                  TIP8            J1.15
V7.telcom8b     B45                  RING8           J1.16
```

Figure 1–12. Sample Fixture Report File Sorted by Component (Page 2 of 2)

1.8 Fixture Specifications (ENCOMPASS)

This subsection discusses describing fixture specifications on a GR5000 or GR9000 running GenRad's ENCOMPASS test management system. To create a fixture description file on a GR5000 or GR9000 running LabWindows/DOS, refer to subsection 1.7.

To describe your test fixture specifications, use ENCOMPASS' Describe Fixture tool. In addition to describing your test fixture specifications, you can can describe how the UUT is wired to the VXIScan interface and the type of wire you want to use to wire these connections. These connections are specified as the scanner UUT terminal names for your test system's instrument connections and UUT signal names for your UUT's connections.

The Describe Fixture tool uses the instrument and power supply configuration information, which you specify using the Describe Configuration tool, and the UUT signal information, which you specify using the Describe UUT tool. These tools are located in the ENCOMPASS' Development functional area under the Program menu.

ENCOMPASS uses the above connection information to create and format a fixture report. To print a fixture report, use ENCOMPASS' Development functional area under the File menu. Refer to Figure 1–13 for an example of a ENCOMPASS fixture report.

For more information about the tools used to describe fixture specifications, refer to the *ENCOMPASS User's Guide*.

Scanner UUT Terminal Name

A scanner UUT terminal name is defined by its slot location and its scanner signal name. The scanner slots are named V0 through V12 and X0 through X12, where the V slots are directly over the corresponding VXI slot numbers, and the X slots are just to the right of them. The scanner signal names are specific to a scanner type. A scanner UUT terminal name is a required entry in the Fixture Description File. An example of a scanner UUT terminal name is: V2.uut1a.

UUT Signal Name

The UUT signal name is the name you assign to either a UUT node name or to a UUT part name and pin number (part.pin) in your test program. Examples of UUT node names are: tip, N1, and 1A+. Examples of UUT part.pin names are: U1.1 and J1.1A. The UUT signal name maps to a scanner UUT terminal name connected to the UUT at the receiver. A UUT node name can also map to one or more part.pin name.

```
                    ENCOMPASS FIXTURE REPORT

Report Name: c:\encomp\programs\op_amp\op_amp.fxr
Report Format:
Report Date: Tue Nov 23 15:13:43 1993
Fixture Attributes
Fixture Date:  Tue Nov 23 15:12:29 1993
Fixture ID:  1234

Test System Requirements

Scanner Slot:          V1  VXI
                       V2  VXI
Instrument Slot:       1 DMM DOC
                       2 ARB DOC
Power Supply:          P1.PS1      20.0 volts      8.0 amps
                       P1.PS2      20.0 volts      8.0 amps

Daisy Chain the following points together to create
fixture id: 1234

V0.B66  GND
V0.B65  ID1
V0.B63  ID3
V0.B62  ID4
V0.B60  ID6
V0.B57  ID9
V0.B56  ID10
V0.B54  ID12
V0.B53  ID13
V0.B52  ID14
V0.B51  ID15
V0.B50  ID16

Well: 1

Connector    Node    Wire Type      Component     Signal Pin

V2.UUT1A     A2      ain+           Standard      #p1.1
V2.UUT1B     B3      ain-           Standard      #p1.2
V1.UUT1A     A2      aout+          Standard      #p1.3
V1.UUT1B     B3      aout-          Standard      #p1.4
V1.UUT2A     A6      vee            Standard      #p1.5, p1.6
V1.UUT2B     B7      gnd            Standard      #p1.7, p1.8
V1.UUT3A     A11     vcc            Standard      #p1.9, p1.10
```

Figure 1–13. Sample ENCOMPASS Fixture Report

1.9 VXIbus Instrument and VXIScan Scanner Cages

The VXIbus instrument cage can accommodate up to 13 VXIbus instrument modules. The cage is oriented with the VXI backplane at the bottom. The VXIbus slots are numbered from 0 through 12, from left to right as shown in Figure 1–14, which illustrates the view when you are looking directly at the test system. The GenRad Slot 0 controller is located in slot 0.

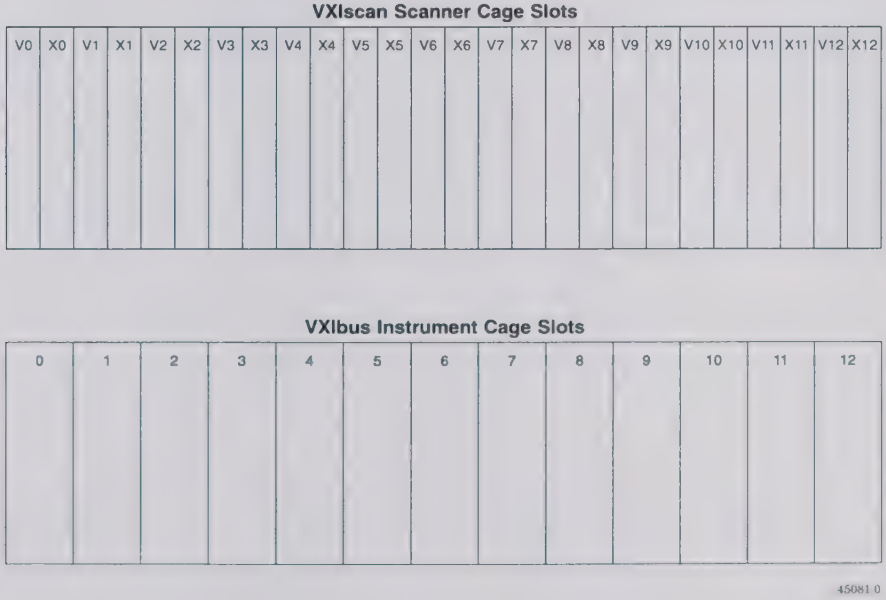

VXIscan Scanner Cage Slots
V0 X0 V1 X1 V2 X2 V3 X3 V4 X4 V5 X5 V6 X6 V7 X7 V8 X8 V9 X9 V10 X10 V11 X11 V12 X12
VXIbus Instrument Cage Slots
0 1 2 3 4 5 6 7 8 9 10 11 12
45081.0

Figure 1–14. Slot Numbering in VXIbus Instrument and VXIscan Scanner Cages

The VXIScan scanner cage is located above the VXIbus instrument cage and extends to the rear of the instrument bay. The scanner cage accommodates twice as many slots as the instrument cage. The scanner cage slots are designated as V0, X0, V1, X1, ... V12, X12 as shown in Figure 1–14. Scanners located in the V slots make a direct connection with the VXIbus instruments residing below them. Scanners located in the X slots do not connect directly to any VXIbus instrument module.

The first scanner slot, V0, is the location of the GenRad Scanner Controller, which connects directly to the Slot 0 controller. The receiver interface connector for the Scanner Controller is shown in Figure 1–15. The receiver interface connectors for the VXI Instrument Scanner, the Hybrid 64–64X3 Scanner, the Digital Interconnect Scanner, the Telecom Differential Scanner, the High Frequency Scanner, and the Power Scanner are shown in Figure 1–16, Figure 1–17, Figure 1–18, Figure 1–19, Figure 1–20, and Figure 1–21.

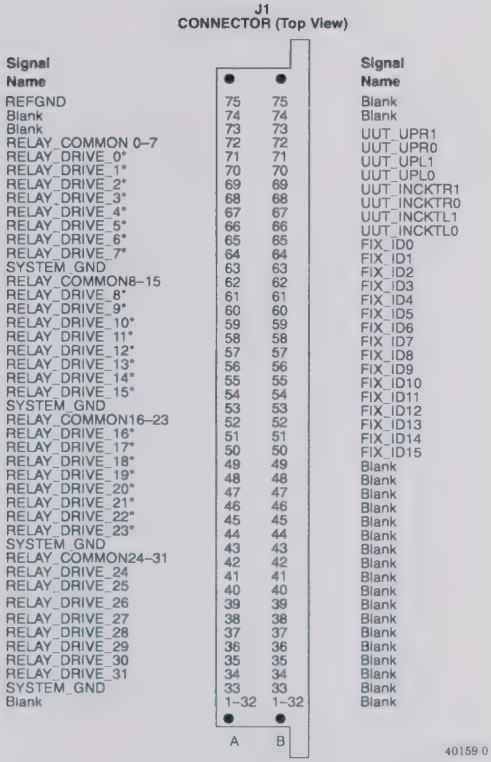


Figure 1–15. Scanner Controller Receiver Interface Connector

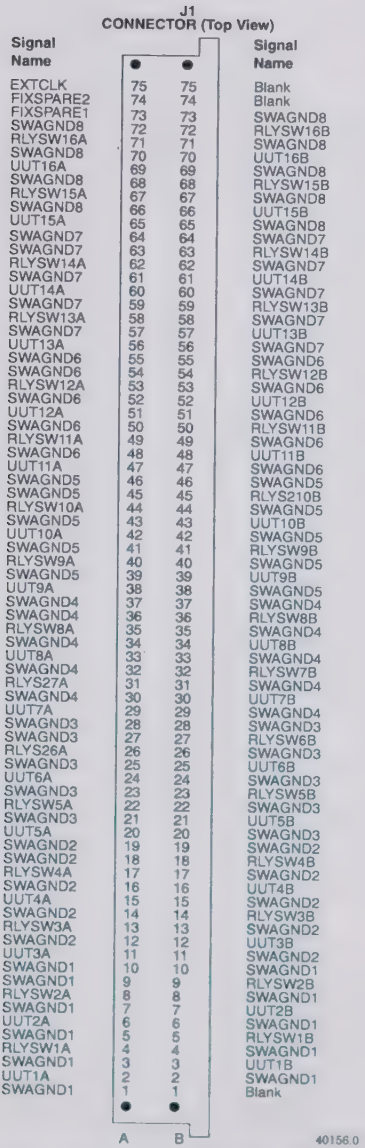


Figure 1–16. VXI Instrument Scanner Receiver Interface Connector

J1
CONNECTOR

Signal Name	Pin No.	Pin No.	Signal Name
Blank	A73–75	B74–75	Blank
SWAGND8	A72	B73	SWAGND8
UUT63	A71	B72	UUT64
SWAGND8	A70	B71	SWAGND8
UUT61	A69	B70	UUT62
SWAGND8	A68	B69	SWAGND8
UUT59	A67	B68	UUT60
SWAGND8	A66	B67	SWAGND8
UUT57	A65	B66	UUT58
SWAGND7	A64	B65	SWAGND8
SWAGND7	A63	B64	SWAGND7
UUT55	A62	B63	UUT56
SWAGND7	A61	B62	SWAGND7
UUT53	A60	B61	UUT54
SWAGND7	A59	B60	SWAGND7
UUT51	A58	B59	UUT52
SWAGND7	A57	B58	SWAGND7
UUT49	A56	B57	UUT50
SWAGND6	A55	B56	SWAGND7
SWAGND6	A54	B55	SWAGND6
UUT47	A53	B54	UUT48
SWAGND6	A52	B53	SWAGND6
UUT45	A51	B52	UUT46
SWAGND6	A50	B51	SWAGND6
UUT43	A49	B50	UUT44
SWAGND6	A48	B49	SWAGND6
UUT41	A47	B48	UUT42
SWAGND5	A46	B47	SWAGND6
SWAGND5	A45	B46	SWAGND5
UUT39	A44	B45	UUT40
SWAGND5	A43	B44	SWAGND5
UUT37	A42	B43	UUT38
SWAGND5	A41	B42	SWAGND5
UUT35	A40	B41	UUT36
SWAGND5	A39	B40	SWAGND5
UUT33	A38	B39	UUT34
SWAGND4	A37	B38	SWAGND5
SWAGND4	A36	B37	SWAGND4
UUT31	A35	B36	UUT32
SWAGND4	A34	B35	SWAGND4
UUT29	A33	B34	UUT30
SWAGND4	A32	B33	SWAGND4
UUT27	A31	B32	UUT28
SWAGND4	A30	B31	SWAGND4
UUT25	A29	B30	UUT26
SWAGND3	A28	B29	SWAGND4
SWAGND3	A27	B28	SWAGND3
UUT23	A26	B27	UUT24
SWAGND3	A25	B26	SWAGND3
UUT21	A24	B25	UUT22
SWAGND3	A23	B24	SWAGND3
UUT19	A22	B23	UUT20
SWAGND3	A21	B22	SWAGND3
UUT17	A20	B21	UUT18
SWAGND2	A19	B20	SWAGND3
SWAGND2	A18	B19	SWAGND2
UUT15	A17	B18	UUT16
SWAGND2	A16	B17	SWAGND2
UUT13	A15	B16	UUT14
SWAGND2	A14	B15	SWAGND2
UUT11	A13	B14	UUT12
SWAGND2	A12	B13	SWAGND2
UUT9	A11	B12	UUT10
SWAGND1	A10	B11	SWAGND2
SWAGND1	A9	B10	SWAGND1
UUT7	A8	B9	UUT8
SWAGND1	A7	B8	SWAGND1
UUT5	A6	B7	UUT6
SWAGND1	A5	B6	SWAGND1
UUT3	A4	B5	UUT4
SWAGND1	A3	B4	SWAGND1
UUT1	A2	B3	UUT2
SWAGND1	A1	B2	SWAGND1
		B1	Blank

Figure 1–17. Hybrid 64–64X3 Scanner Receiver Interface Connector

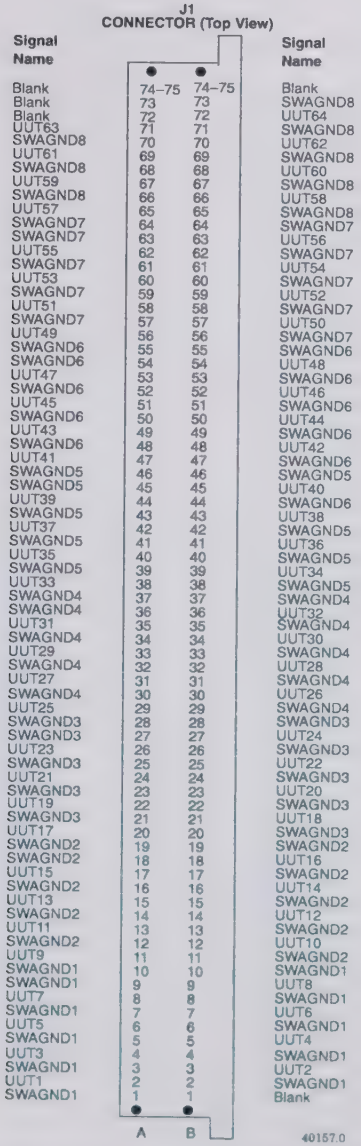


Figure 1–18. Digital Interconnect Scanner Receiver Interface Connector

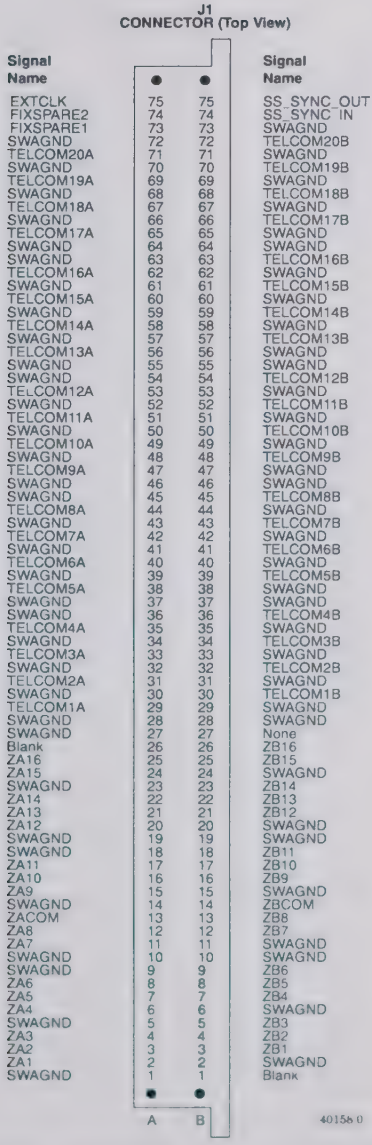


Figure 1–19. Telecom Differential Scanner Receiver Interface Connector

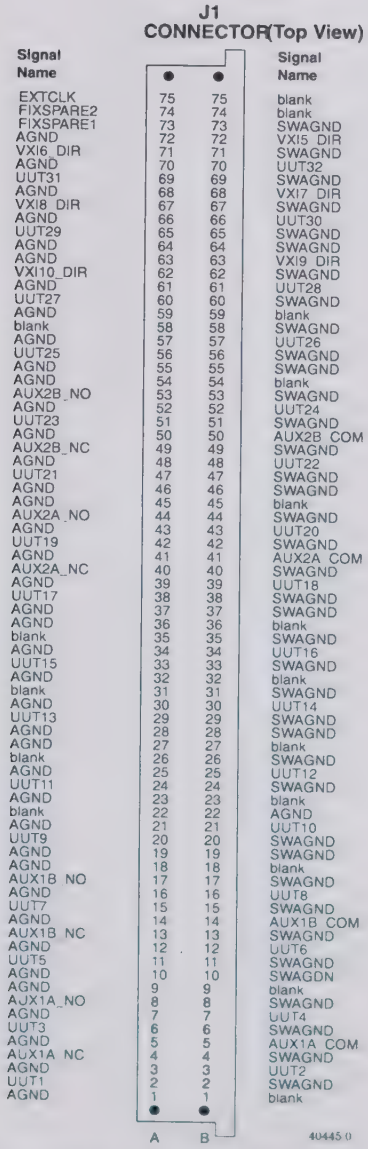


Figure 1–20. High Frequency Scanner Receiver Interface Connector

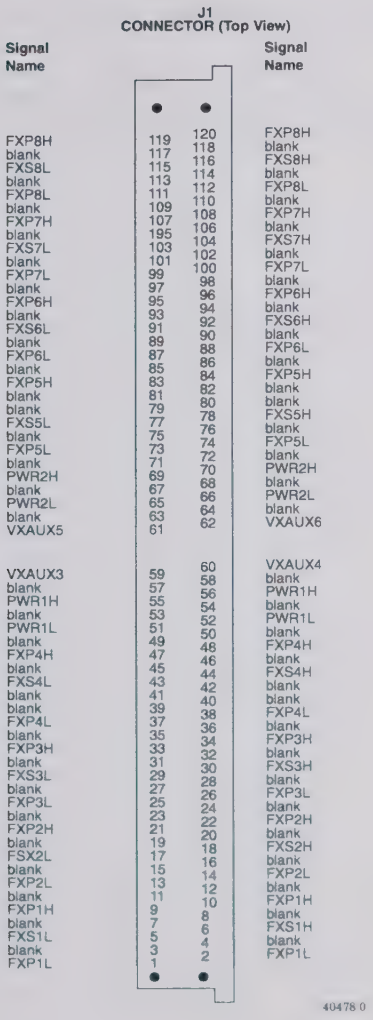


Figure 1–21. Power Scanner Receiver Interface Connector

1.10 Fixture Wiring for Scanner Controller Functions

You can add wiring to your fixture for fixture relay drivers, fixture identification codes, fixture position sensing, reference ground signal, and power supplies.

1.10.1 Fixture Relay Driver Wiring

Fixture relay drivers allow you to control custom power supplies and other custom circuits from within your test program. Four designated pins in slot V0 serve as Common (power source) lines for the relay drivers; four designated System Ground pins serve as the corresponding return line connection point. Associated with each of the four Common/System Ground line pairs are eight designated pins in slot V0 which serve as control lines for eight individual custom circuits. Refer to Figure 1–22 for an example of the wiring required for using the fixture relay drivers.

Open Fixture Relay Driver Function

The following example illustrates the `SccUserRelayClear` function you use to open the fixture relay driver. This function is available on a GR5000 or a GR9000 running LabWindows/DOS or Lab/Windows/CVI.

Example

```
short status;
short mainframe;
status = SccUserRelayClear(mainframe, SCC_RELAYALL);
if (!IsSuccess(status))
    {
    MsPut(status);
    if (IsError(status))
        exit(1);
    }
```

Close Fixture Relay Driver Function

The following example illustrates the `SccUserRelaySet` function you use to close the fixture relay driver. This function is available on a GR5000 or a GR9000 running LabWindows/DOS or Lab/Windows/CVI.

Example

```
short status;
short mainframe;
status = SccUserRelaySet(mainframe, SCC_RELAY1);
if (!IsSuccess(status))
    {
    MsPut(status);
    if (IsError(status))
        exit(1);
```

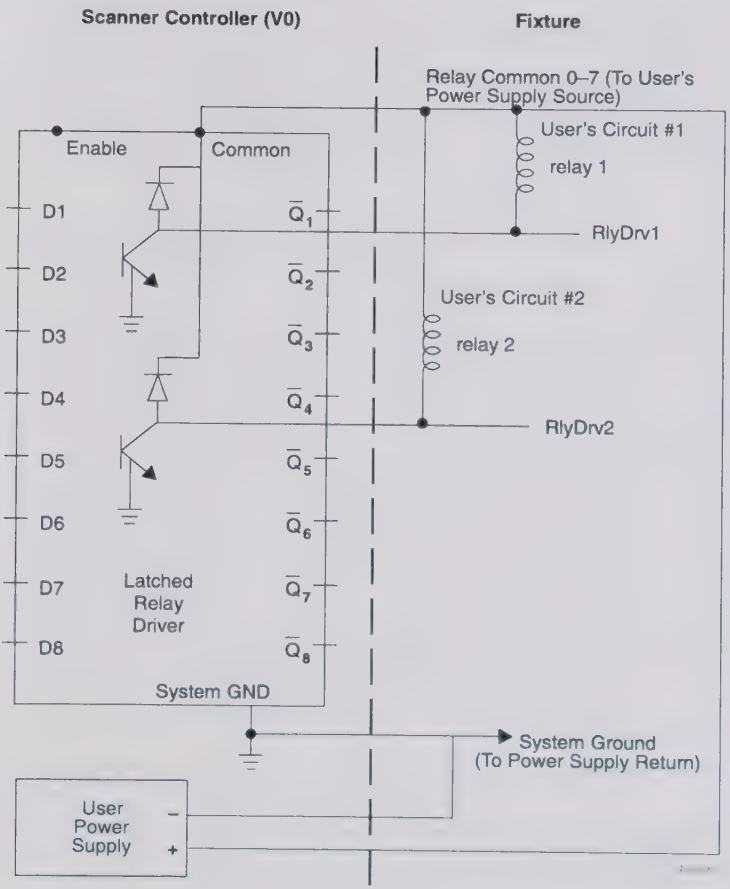


Figure 1–22. Sample Wiring for Fixture Relay Drivers

1.10.2 Fixture ID Wiring

You can include wiring in your test fixture for specific fixture identification codes called fixture IDs. To verify correct wiring, use the `SccFixtureID` function to read the fixture ID and check it against the known fixture ID. Refer to your test system's function reference manual or the GenRad Function Panel on–line help for more details on the `SccFixtureID` function.

You use fixture IDs to identify the fixture when you start a test program. Sixteen designated pins in slot V0 (V0.B50 through V0.B65) are available for identifying the UUT. You wire the fixture ID number that you assign to the test fixture as a binary code.

To specify a 0, connect the ID pin to the associated ground pin on the receiver. To specify a 1, leave the ID pin unconnected or open. You can implement this by daisy chaining the zero bits of the fixture ID to a System Ground receiver pin, for example, V0.B66.

Add the unconnected logic 1 values to obtain the decimal ID number. Refer to Table 1–2 for an example of the fixture wiring for fixture ID 7566.

Read Fixture ID Function

Example

The following example illustrates the `SccFixtureID` function you use to verify correct fixture ID wiring. This function is available on a GR5000 or a GR9000 running LabWindows/DOS or Lab/Windows/CVI.

```
short mainframe;
long fixture_id;
fixture_id = SccFixtureID(mainframe);
if (!IsSuccess(fixture_id))

    MsPut(fixture_id);
    if (IsError(fixture_id))
        exit(1);
```

Table 1–2
Fixture ID Wiring Example

Fixture Wiring	ID#	Unconnected Binary Value	Value Needed for 7566 ID	Fixture Wiring for 7566 ID
V0.B65	ID0	1	0	GND (V0.B66)
V0.B64	ID1	2	2	open
V0.B63	ID2	4	4	open
V0.B62	ID3	8	8	open
V0.B61	ID4	16	0	GND (V0.B65)
V0.B60	ID5	32	0	GND (V0.B61)
V0.B59	ID6	64	0	GND (V0.B60)
V0.B58	ID7	128	128	open
V0.B57	ID8	256	256	open
V0.B56	ID9	512	0	GND (V0.B59)
V0.B55	ID10	1024	1024	open
V0.B54	ID11	2048	2048	open
V0.B53	ID12	4096	4096	open
V0.B52	ID13	8192	0	GND (V0.B56)
V0.B51	ID14	16384	0	GND (V0.B52)
V0.B50	ID15	32768	0	GND (V0.B51)

1.10.3 Fixture Position Sensing Wiring

You can include wiring for fixture position sensing in your Bed–of Nails test fixture. Four pairs of designated pins in slot V0 (V0.B66 through V0.B73) are available for sensing fixture position. Each pair should be wired to the appropriate sensing switch in the fixture to enable programmed control based on the sensed position of the fixture. Refer to Figure 1–15 for an illustration of the receiver interface connector for the Scanner Controller.

The test system supports up to two well sections, labeled "1" and "2". Each well section describes a separate section of the fixture. You can use two wells for testing multiple UUTs alternately, to improve throughput.

Refer to Table 1–3 for a summary of fixture position sensing wiring.

Table 1–3
Fixture Position Sensing Wiring

Fixture Wiring	Signals	Purpose
V0.B66 V0.B67	GND UUT_INCKTL1	Fixture down left detection switch
V0.B68 V0.B69	GND UUT_INCKTR1	Fixture down right detection switch

1.10.4 Power Supply Wiring

The terminals of each programmable power supply are brought out via cables to the power–block connector at the receiver shelf. This connector is near the left edge of the shelf and is easily recognized by its large pins. Two pins connected in parallel make each of the main current–carrying connections. Refer to Table 1–4 and Figure 1–23 for a key to these pin assignments. The view of the power block in Figure 1–23 is as seen from above, when you stand at the front of the receiver. The table is arranged so the entries match the physical arrangement of the pins in the power block as shown in Figure 1–23. Notice that each pin in the middle column is tied directly to the pin at its left.

NOTE The pin arrangement in the power block is the same as the arrangement of entries in column 1 of this table.

Table 1–4
Key to Power–Block Pins for Programmable Power Supplies

Pin Designations	Power Supply Module Number	Terminal Connected via: Left Pin	Middle Pin	Right Pin
PB40, PB41, PB42	7	Output high	Output high	Sense high
PB37, PB38, PB39	7	Output low	Output low	Sense low
PB34, PB35, PB36	6	Output high	Output high	Sense high
PB31, PB32, PB33	6	Output low	Output low	Sense low
PB28, PB29, PB30	5	Output high	Output high	Sense high
PB25, PB26, PB27	5	Output low	Output low	Sense low
PB22, PB23, PB24	4	Output high	Output high	Sense high
PB19, PB20, PB21	4	Output low	Output low	Sense low
PB16, PB17, PB18	3	Output high	Output high	Sense high
PB13, PB14, PB15	3	Output low	Output low	Sense low
PB10, PB11, PB12	2	Output high	Output high	Sense high
PB07, PB08, PB09	2	Output low	Output low	Sense low
PB04, PB05, PB06	1	Output high	Output high	Sense high
PB01, PB02, PB03	1	Output low	Output low	Sense low

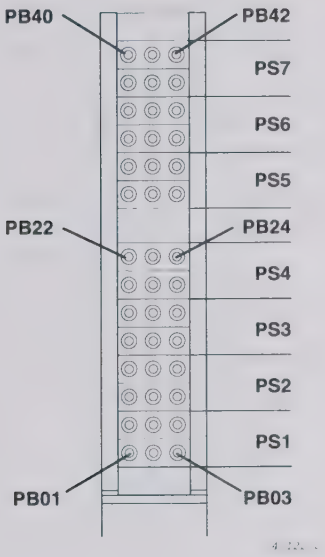


Figure 1–23. **Pin Arrangement in the Power Block Connector**

1.11 Fixture Wiring Suggestions

Fixture wiring is an extension of the test system scanners and system resources and can at times introduce unpredictable effects. These effects are more critical in digital than analog testing, since logic–level transitions can involve higher frequencies than in analog testing. The following considerations and suggestions for wiring techniques will minimize these effects.

The use of short wires is one of the most important factors in high speed fixtures. The magnitude of the undesirable coupling is logarithmically proportional to the wire size (changes slowly with size). The capacity and inductance are directly proportional to wire length. Therefore, the shortest wires of convenient size are best, but leave enough slack to allow for later servicing or alterations.

Multiple Ground Wires

The use of multiple ground wires of convenient size is more effective than a single, large wire. Multiple wires allow a low impedance distribution of ground current to the UUT. Connect one ground to the ground plane for each digital driver/sensor connection.

Twisted Pair Wires

For faster, higher current, or more critical signals, such as signals with fast transitions or clocks, use twisted–pair wires preferably 24–gauge with 5 twists per inch. Route the pair as close to the ground plane as practical. Attach the return wire of the twisted pair to the ground plane at both the nail and interface board ends. Soldering is the preferred method of attaching. Keep the loop at the breakouts as small as possible. These techniques will, however, add capacitance to the node (refer to Figure 1–24)

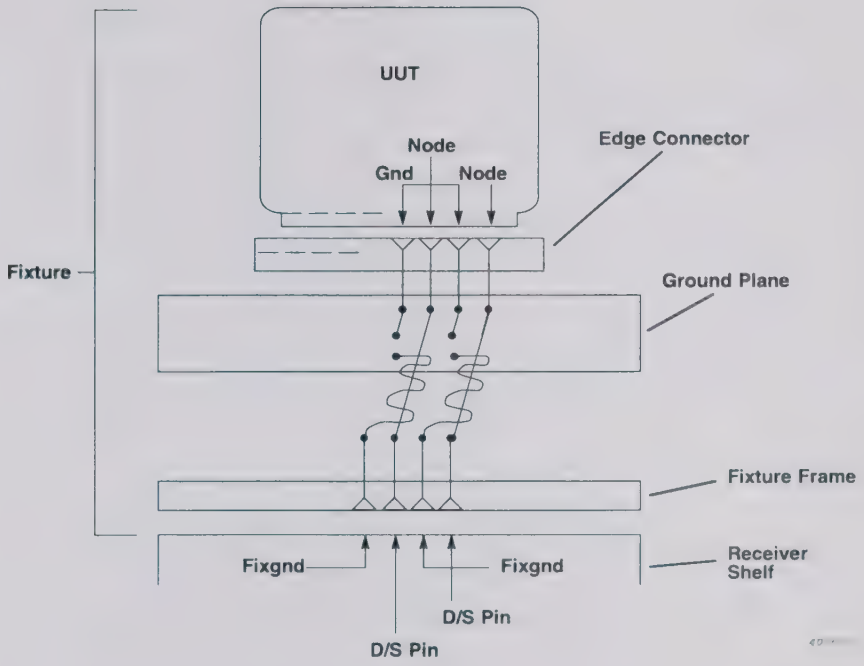


Figure 1–24. **Twisted Pair Wiring for Driver/Sensor Connections**

Coaxial Wires

For very fast, high current, or very critical signals (where twisted pair wiring is not effective), use coaxial cable. Terminate the shields as was specified for the twisted pair. Very high–current devices are normally very fast; therefore, slew is often a critical parameter, and inductance will aggravate the slew problem. (Coax will, however, add capacitance to the node, and this effect must be considered.) Alternatively, where debugging shows that reflections on an unshielded wire are causing problems, loop the wire 2 or 3 times through a small ferrite bead just below the test nail. Reflections can also be attenuated by a small (e.g., 100–ohm) resistor connected in series with the test nail; however, test points with these resistors cannot provide shorts tests on the node. For clock–driver outputs from the test system, a 100–ohm resistor between the nail and ground plane may be required to reduce reflections.

Ground Plane

Make use of a common copper ground plane located as close as possible to the edge connector. The ground plane should be as large as practical. Connect the edge–connector power and signal ground pins to the ground plane with the shortest possible wires. The use of copper foil is suggested as the best method (refer to Figure 1–24 and Figure 1–25).

System Ground

System ground is located on the Slot 0 interface connector, which is always connected to system ground. Use it for all of your relay driver power supply return connections.

Switchable Ground

Switchable ground is located on scanner module. This ground under software control and you can switch it in or out depending on your testing needs.

Reference Ground

The reference ground signal at V0.A75 on the receiver provides a high–quality ground sense point. To use it, you should wire the reference ground signal on the receiver to the point on the UUT ground node that you choose to be the measurement sense reference point.

NOTE	Reference ground is only for reference measurements. Do not use it for a power supply connection.

VCC Bus

A common copper VCC bus may also be desirable for use with power supply wiring. It can consist of a bus bar, an etch on the ground plane, or a lug. The bus needs to be located as close as possible to the edge connections so that the interconnecting leads are as short as possible (refer to Figure 1–25).

Power Wiring

The following are a number of suggestions for power wiring:

- Use multiple 16–18 gauge wire connections for power and power return. The wire should be rated for 200 volts, 105° C minimum to avoid overheating the wires.
- Wire the power supply returns, using separate wires, to the ground plane mounted in the fixture. All return connections should be used with UUT Power Supplies (refer to Figure 1–25).
- It is recommended that the power supply leads be wired directly to the edge–connector pins using all of the power supply pins. Avoid using a bus technique of using a single wire between the bus and the fixture.

- Wire the edge–connector power source and power return pins directly to the appropriate power supply sense connections.
- Use 20–28 gauge wire for power supply sense leads.
- Wire power supply sense leads to current leads at the UUT.
- Power–supply regulation is guaranteed only at the point where the power–supply voltage sense line is connected to the supply lines. The sense line should therefore be connected close to the supply bus, and, when large currents are drawn, the wires to the supply nails should be physically fanned out from a central point to which the sense line is connected. Avoid connecting supply nails in a daisy chain.

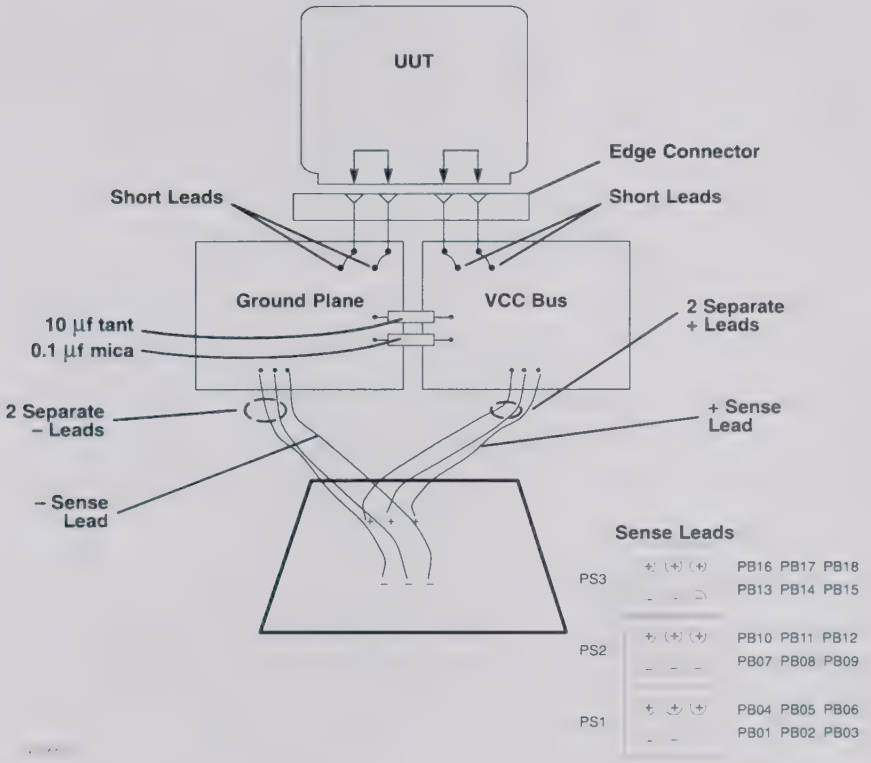


Figure 1–25. UUT Power Supply Wiring for VCC using a Ground Plane and a VCC Bus

Miscellaneous Suggestions

As an aid to wiring, you can use a color–coding scheme for wire–wrap wires in the fixture. Some suggestions for the choices of colors and their use are:

- All VCC pins – red
- All ground pins – black
- All other supply voltage pins – a different color
- All signal points associated with a given UUT edge–connector socket should be a certain color (e.g., connector 1 – white, connector 2 – blue).

If node numbers were assigned by pages of a multi–page schematic, have each page of nodes represented by a color.

Determine the Fixture Identification for this fixture and record it in the Fixture Description File.

Select the power supplies to be used and record them.

A low–impedance ground path is essential. Use all available ground nails on the receiver even when they are associated with unused D/S lines.

Keep signal wires as short as practical.

Provide multiple VCC or power nails. Solder low–inductance capacitors from the power–supply nails to the ground plane. (Several additional large–value electrolytic capacitors are often helpful.) The capacitors store the energy required for transient activity and suppress the higher frequency currents that could induce cross talk to other lines.

For low–to–moderate current signals, use point–to–point wiring and/or route the wires for maximum separation.

Route all wires as close to the ground plane as is practical. This minimizes the effective inductance of the wire. (Wiring input/output connections after the ground connections should help mechanically. Cyanoacrylic adhesives (such as Eastman 910 or Super Glue) are useful in holding the wires against the ground plane.)

To reduce cross–talk, never bundle wires.

Make connection of the ground nails on the fixture interface board to the ground plane with leads as short as possible. Soldering the lead to the ground plane is best, although wire–wrap posts can be used for convenience.

1.12 Fixture Testing

After your fixture is built, it should be thoroughly checked for correct wiring before being powered–up or connected to a UUT.

CAUTION

This subsection deals with wiring inside a bed–of–nails fixture. When debugging the fixture, do not open the fixture or release the vacuum while power is applied because voltage spikes could damage UUT components.

1.12.1 Fixture Documentation for Wiring Check

Obtain and review all appropriate fixture documentation supplied by the fixture vendor. Also, obtain copies of the Fixture Report files you created for the fixture vendor.

1.12.2 Power Wiring Check

Check for proper connection of:

- Power supply sense leads
- Power supply wired for correct polarity

Inspect and verify the power wiring.

- Visually Inspect carefully
- Measure resistance (no shorts) across any of the power leads and to ground
- Check the continuity of the power wiring (including ground returns) at the UUT connector (typically an edge–connector pin or a nail) to ensure that power is applied only to the appropriate UUT test interface nodes.

1.12.3 UUT Wiring Check: Shorts and Continuity Tests

Verify correct wiring exists between the UUT interface points and the assigned test system nails. Continuity checks can be made with an external instrument.

1.12.4 Power–Up Tests

WARNING

DANGEROUS VOLTAGES AND ENERGY LEVELS MAY BE PRESENT DURING TESTING. TO PREVENT ELECTRIC SHOCK, DO NOT TOUCH UNIT UNDER TEST.

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WARNING

When installing a test fixture, verify that the appropriate set of UUT power supplies are installed in the power bay. Failure to have the proper set in place could invalidate some tests and damage the UUT.

Install the fixture on the test system. Using the Fixture Report files, prepare a brief test program for testing voltages supplied to the UUT. Using a Digital Volt Meter (DVM), measure every power node with reference to their respective ground node on the fixture and verify that the correct voltage is present.

Connect Ground Function

The following example illustrates the `SccFixtureGNDConnect` function you use to connect grounds before you power up your UUT. This function is available on a GR5000 or a GR9000 running LabWindows/DOS or Lab/Windows/CVI.

Example

```
short status;
status = SccFixtureGNDConnect();
if (!IsSuccess(status))
    {
    MsPut(status);
    if (IsError(status))
        exit(1);
    }
```

Disconnect Ground Function

The following example illustrates the `SccFixtureGNDDisconnect` function you use to disconnect grounds after you power down your UUT. This function is available on a GR5000 or a GR9000 running LabWindows/DOS or Lab/Windows/CVI.

Example

```
short status;
status = SccFixtureGNDDisconnect();
f (!IsSuccess(status))
    .
    MsPut(status);
    if (IsError(status))
        exit(1);
    .
```

1.13 Loading the Fixture Description File

Before you can make any scanner connections in your test program, you must first initialize and configure the system for the current fixture file. The function that performs the initialization is:

```
ScanLoadFixture(fixture_description_filename, well_name);
```

where:

fixture_description_filename is the name of the Fixture Description File (.FXD).

well_name is the name of the well section in the Fixture Description File to load.

This function is available on a GR5000 or a GR9000 running LabWindows/DOS or Lab/Windows/CVI.

Example

The parameters required for the fixture load function are the ASCII name and path of your fixture file and which well section of the file to use.

```
#define BUFLEN 80   /* string length */

main ()
    {
    short status;
    char scan_err[BUFLEN]

'* load fixture */
    status = ScanLoadFixture("c:\\scan\\doc\\fixture.fxd", 1);
    if (!IsSuccess(status))
        {
        ScanGetError(scan_err, BUFLEN);
        MsPutS(status, scan_err);
        if (IsError(status))
            exit(1);
        }
```

Index

Symbols

.FXC File. *See* Fixture Report Files

.FXD File. *See* Fixture Description File

.FXN File. *See* Fixture Report Files

.FXR File. *See* Fixture Report Files

.FXS File. *See* Fixture Report Files

.POWER, 1–27

B

Bed–of–Nails Fixture, 1–13

C

Cages
  instrument bay, slot numbering, 1–47
  slots, instrument bay, 1–47

Coaxial Wires, 1–66

Comments, 1–17
  in fixture description file, 1–17, 1–19, 1–29

Configuration Resource Requirements, 1–2, 1–8
  special considerations, 1–9

D

Describe Configuration Tool, 1–44

Describe Fixture Tool, 1–44

Dual–Ported Fixture, fixture well section, 1–27

E

Edge–Connector Fixture, 1–12

F

Fixture
  adding multiple UUT connectors, 1–15
  bed–of–nails, 1–13
  components, 1–10
  construction, 1–10
  creation process, 1–1
  description of, 1–3
  edge–connector, 1–12
  installing the fixture, 1–6
  removing the fixture, 1–7
  test point, 1–11
  wiring fixture ID, 1–59
  wiring fixture position sensing, 1–61
  wiring power supply, 1–61
  wiring reference ground connection, 1–67
  wiring relay driver, 1–56
  wiring suggestions, 1–64

Fixture Attribute Section, 1–24–1–32
  data, 1–24
  label, 1–24
  label options, 1–25

Fixture Description File, 1–26
  creating a, 1–18
  defining connections in, 1–16

description of, 1–16
example, 1–30
fixture attribute section, 1–17, 1–24–1–32
customizing, 1-19
data, 1-24
entry syntax, 1-24
label, 1-24
fixture well section, 1–17, 1–26–1–43
entry syntax, 1-27
purpose of, 1–16
syntax rules, 1–17, 1–29

Fixture Design Issues, 1–15
adding multiple UUT connectors, 1–15
fixture sizes, 1–15

Fixture ID, 1–59
to verify correct wiring, 1–59
verify ID function, example of, 1–59

Fixture Interface, 1–2

Fixture Kits, 1–14

Fixture Position Sensing, wiring, 1–61

Fixture Relay Driver
close function, example of, 1–57
open function, example of, 1–57
wiring, 1–56

Fixture Report, using ENCOMPASS, 1–46

Fixture Report Files
.FXD, 1–33
creating, 1–33
purpose of, 1–33
sorting 80 characters wide, 1–35
sorting by component name (.FXC), 1–35
sorting by node number (.FXN), 1–34
sorting by slot number (.FXC), 1–34
sorting132 characters wide, 1–35

Fixture Sizes, 1–15

Fixture Specifications, using ENCOMPASS, 1–44

Fixture Testing, 1–71
power wiring check, 1–72
power–up check, 1–74
UUT wiring check, 1–72

Fixture Types
bed–of–nails, 1–10
edge connector, 1–10

Fixture Vendor Requirements, 1–14

Fixture Well Section, 1–26–1–43
.POWER, 1–27
dual–ported fixture, 1–27
entry syntax, 1–27
power description record, 1–27
syntax rules, 1–29

Fixture Wiring
coaxial wires, 1–66
ground plane, 1–66
miscellaneous suggestions, 1–70
multiple ground wires, 1–64
power supply, 1–67
reference ground, 1–67
switchable ground, 1–66
system ground, 1–66
twisted pair wires, 1–64
VCC bus, 1–67

Functions
ScanLoadFixture, 1–24, 1–75
example of, 1-75
SccFixtureGNDConnect, 1–74
example of, 1-74
SccFixtureGNDDisconnect, 1–74
example of, 1-74
SccUserRelayClear, 1–57
SccUserRelaySet, 1–57

G

Ground Plane, 1–66

M

Multiple Ground Wires, 1–64

O

Operational Verification Fixture (OVF),
posted warning, 1–5

P

Power Description Record, 1–27
Power Supply, wiring, 1–61
Power Supply Wiring, 1–67

R

Receiver Interface Connector
Digital Interconnect Scanner, 1–52
High Frequency Scanner, 1–54
Hybrid 64–64X3 Scanner, 1–51
Power Scanner, 1–55
Scanner Controller, 1–49
Telecom Differential Scanner, 1–53
VXI Instrument Scanner, 1–50
Reference Ground, 1–67
Reference Ground Connection, wiring, 1–67

S

ScanLoadFixture, 1–24, 1–75
Scanner Signal Names, 1–16, 1–45
Scanner Slot Location, 1–16, 1–45
Scanner UUT Terminal Name, 1–16, 1–45
SccFixtureGNDConnect, 1–74
SccFixtureGNDDisconnect, 1–74
SccUserRelayClear, 1–57
SccUserRelaySet, 1–57
Slots, instrument bay, 1–47
Switchable Ground, 1–66
Syntax Rules, 1–17
fixture description file, 1–17
for fixture description file, 1–29
System Ground, 1–66

T

Third–Party Instruments, 1–2
Twisted Pair Wires, 1–64

U

UUT Signal Name, 1–17, 1–45

V

VCC Bus, 1–67
Virtual Power Supply, creating a, 1–27
VXI Instrument Cage, slot numbering, 1–47
VXIScan Scanner Cage, slot numbering, 1–47

W

Wiring
fixture ID, 1–59
fixture position sensing, 1–61
fixture power supply, 1–61
fixture reference ground connection, 1–67
fixture relay driver, 1–56
fixture wiring suggestions, 1–64

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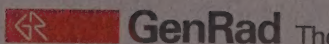

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